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BULLETIN

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A taxonomic study of the Pteridophyta of the Hawaiian Islands—II

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(WITH PLATES 40–44)

5. POLYPODIACEAE

Plants various in habit. Rootstock erect or creeping; leaves circinate in vernation, blades simple to quadripinnate; sporangia covering the lower surface in a uniform layer or arranged in linear, roundish, or oval sori; these indusiate or non-indusiate; sporangia stalked; annulus incomplete.

Sporangia scattered over the under surface of the leaf blade in a uniform layer.	1. *Elaphoglossum.*
Sporangia in definite sori.	
Sori marginal or submarginal.	
Indusium present.	
Sori continuous or interrupted, indusium formed of the more or less modified leaf margin.	
Indusium opening inward.	
Sporangia arising from a continuous veinlike receptacle, connecting the ends of the veins.	
Indusium single.	2. *Pteris.*
Indusium double.	3. *Pteridium.*
Sporangia arising from the unconnected ends of veins.	
Leaf margin continuously reflexed in fertile leaflets.	
Veins free.	4. *Pellaea.*
Veins anastomosing.	5. *Doryopteris.*

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Separate lobes of leaf margin reflexed as indusia.
Leafstalks black, shining. 6. *Adiantum.*
Leafstalks brownish, dull.
Sori distinct in sinus of leaf. 7. *Hypolepis.*
Sori crowded. 8. *Schizostege.*
Indusium opening outward.
Pinnae strongly developed on anterior side.
Sori transverse on the expanded tips of free or anastomosing veins, segments dimidiate or cuneate. 9. *Diellia.*
Sori on the expanded tips of free veins with no intramarginal vein, pinnae only slightly developed on posterior side. 10. *Odontoloma.*
Pinnae developed on both sides of the midrib, though not equally.
Indusium attached only at the base; pinnae jointed to the midrib. 11. *Nephrolepis.*
Indusium attached on three sides.
Ultimate segments cuneate. 12. *Odontosoria.*
Ultimate segments not cuneate but toothed or lobed. 13. *Microlepia.*
Indusium absent; sporangia sunken in a marginal groove. 14. *Vittaria.*
Sori dorsal, with or without indusia.
Indusium partly inferior, hood-shaped. 15. *Filix.*
Indusium superior or wanting.
Indusium wanting.
Sporangia following the veins.
Under surface covered with a waxy powder. 16. *Ceropteris.*
Under surface not covered with a waxy powder. 17. *Coniogramme.*
Sporangia in definite, roundish sori.
Leaves non-articulate. 18. *Dryopteris* (in part).
Leaves articulate.
Veins free. 19. *Polypodium.*
Veins anastomosing with free included veinlets.

Veins indistinct, leaf blade simple.	20. *Phymatodes.*
Veins distinct, leaf blade pinnatifid.	21. *Phlebodium.*
Indusium present.	
Sori roundish or oval.	
Veins free.	
Indusium circular, attached in the center.	22. *Polystichum.*
Indusium reniform or orbicular, attached at the side or in the sinus.	18. *Dryopteris* (in part).
Veins anastomosing.	
Veins anastomosing regularly to form one or more areolae, with free included veinlets.	23. *Cyrtomium.*
Veins anastomosing copiously, with few included veinlets.	24. *Tectaria.*
Sori elongate, on the veins or crossing them.	
Leaf blades simple.	25. *Neottopteris.*
Leaf blades pinnate to quadripinnate.	
Veins free; sori oblique to the midrib.	
Sori simple on the outer side of the veinlet or crossing it.	
Sori usually straight.	26. *Asplenium.*
Sori usually curved, often crossing the veinlet.	27. *Athyrium.*
Sori double, usually opening outward.	28. *Diplazium.*
Veins anastomosing; sori parallel to the midrib.	
Sori continuous.	29. *Sadleria.*
Sori interrupted.	30. *Doodia.*

1. ELAPHOGLOSSUM Schott, Gen. Fil. *pl. 14.* 1834

Mostly tropical plants found growing upon rocks or as epiphytes in the forests. Rootstock erect or creeping; leaves articulate, simple; blades of fertile leaves usually narrower than those of sterile leaves; veins usually free, occasionally anastomosing; sporangia covering the lower surface of the leaf, non-indusiate.

Type species: *Elaphoglossum conforme* (Sw.) Schott.

Veins free.
- Leaves densely covered with brown scales. — *E. hirtum.*
- Leaves smooth or bearing minute scattered scales.
  - Rootstock slender, 1–5 mm. in diameter.
    - Leaf blades oblong-lanceolate, acuminate. — *E. micradenium.*
    - Leaf blades linear or linear-oblanceolate, acute or somewhat obtuse. — *E. aemulum.*
  - Rootstock stout, 2–4 cm. in diameter; leaf oblanceolate, obtuse. — *E. Wawrae.*

Veins not free.
- Veins anastomosing freely throughout. — *E. reticulatum.*
- Veins united by a marginal vein. — *E. gorgonium.*

ELAPHOGLOSSUM HIRTUM (Sw.) C. Chr. Ind. Fil. 308. 1905

Acrostichum hirtum Sw. Jour. Bot. Schrad. **1800**[2]: 10. 1801.

Acrostichum squamosum Sw. Jour. Bot. Schrad. **1800**[2]: 11. 1801. Not Cav.

Acrostichum vestitum Lowe (*paleaceum* in plate); Hook. & Grev. Ic. Fil. **2**: 235. 1831. Not Schl. & Cham. Linnaea **5**: 605. 1830.

Elaphoglossum squamosum J. Sm. Jour. Bot. Hook. **4**: 148. 1841.

Elaphoglossum vestitum J. Sm. Ferns Brit. & For. 106. 1866.

Acrostichum micans Mett. in Kuhn, Linnaea **36**: 50. 1869.

TYPE LOCALITY: Azores (?)

DISTRIBUTION: Exposed ridges at 900–1,200 m. elevation, also on banks of streams in woods, tropical countries.

SPECIMENS EXAMINED: Hawaii, *Wilkes Expedition* C, N; *Robinson 272* V; *274* V; *283* V; Maui, *Lichtenthaler* N; *Heller 2688* C, N; Hawaiian Islands, *Baldwin 99* C, N; *Hillebrand* C; *Lindley* C; *Miss Sessions* C; ex Herb. John Donnell Smith N.

The description of *E. hirtum* by Swartz in Jour. Bot. Schrad. **1800**[2]: 10. 1801 is inadequate but is amplified in Syn. Fil. 194. 1806.

ELAPHOGLOSSUM MICRADENIUM (Fée) Moore, Ind. Fil. 12. 1857

Acrostichum micradenium Fée, Mém. Foug. **2**: 43. 1845.

Elaphoglossum nitidum Brack. Fil. U. S. Expl. Exp. 70. 1854.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: On rocks and trees from 300 m. elevation upwards; Hawaiian Islands.

ILLUSTRATIONS: Fée, Mém. Foug. **2**: *pl. 8, f. 1.* 1845; Brack. Fil. U. S. Expl. Exp. *pl. 9, f. 3.* 1854.

SPECIMENS EXAMINED: Hawaii, *Wilkes Expedition* N; Maui, *Lichtenthaler* N; Oahu, *Robinson 49* V; *75* V; *110* V; *Safford 875* N; Kauai, *Heller 2621* C, N; Hawaiian Islands, *Baldwin 97* C, N; *Hillebrand* C; *Wilkes Expedition* C.

ELAPHOGLOSSUM AEMULUM (Kaulf.) Brack. Fil. U. S. Expl. Exp. 71. 1854

Acrostichum aemulum Kaulf. Enum. 63. 1824.

Olfersia aemula Presl, Tent. Pterid. 235. 1836.

Acrostichum Helleri Underw. in Heller, Minn. Bot. Stud. 1: 771. 1897.

TYPE LOCALITY: Oahu.

DISTRIBUTION: On trees at 900–1,200 m. elevation; Tropical America, Africa, India, Malaysia, and Australia.

ILLUSTRATION: Underw. in Heller, Minn. Bot. Stud. 1^2: 42. 1897.

SPECIMENS EXAMINED: Hawaii, *Robinson*; Oahu, *Chamisso* B; *Forbes* BM; Kauai, *Heller 2709* C, N; *Kuntze 23037* C; Hawaiian Islands, *Gaudichaud* C.

ELAPHOGLOSSUM WAWRAE (Luerssen) C. Chr. Ind. Fil. 318. 1906

Elaphoglossum aemulum Brack. Fil. U. S. Expl. Exp. 71. 1854. Not Kaulf. Enum. Fil. 63. 1824.

Acrostichum Wawrae Luerssen, in Wawra, Flora **58**: 420. 1875.

TYPE LOCALITY: Kauai.

DISTRIBUTION: In forests and on dry shaded rocks at 1,200 m. elevation; common; Hawaiian Islands.

ILLUSTRATION: PLATE 40.

SPECIMENS EXAMINED: Hawaii, District of Puna, *Wilkes Expedition* N; District of Waimea, *Wilkes Expedition* N; Mauna Loa, above 2,400 m., *Wilkes Expedition* N; Maui, *Lichtenthaler* N; *Mann & Brigham* N; *Robinson 309* V; *315* V; *355* V; Kauai, *Forbes 530* BM; *Heller 2808* C, N; Hawaiian Islands, *Bailey* C; *Baldwin 98* C, N; *Wilkes Expedition* C.

Brackenridge named his specimens of *Elaphoglossum Wawrae E. aemulum* and gave Kaulfuss's description of *Acrostichum aemulum* (Enum. 63. 1824), with slight changes, in his report, transferring the species from *Acrostichum* to *Elaphoglossum* (Brack.

Fil. U. S. Expl. Exp. 71. 1854). However, his specimens in the U. S. National Herbarium at Washington do not correspond with Kaulfuss's description of *A. aemulum* in dimensions or in other characters. The series of specimens noted above seems to represent but one species as indicated by the texture, uniform punctuations, and revolute margins of the leaves, and by the oblong-lanceolate scales of the rhizome. The dimensions of the leaves are fairly constant with the exception of a few plants, as *Baldwin 98* and *Wilkes Expedition*, Hawaii, District of Puna, which are smaller than the others.

ELAPHOGLOSSUM RETICULATUM (Kaulf.) Gaud. Voy. Bonite Bot. 1846

Acrostichum reticulatum Kaulf. Enum. 64. 1824.
Acrostichum crassifolium Gaud. Voy. Freyc. Bot. 303. 1828.
Hymenodium crassifolium Fée, Mém. Foug. **2**: 91. 1845.
Anetium reticulatum Presl, Epim. 176. 1849.
Hymenodium reticulatum Moore, Ind. Fil. 19. 1857.

TYPE LOCALITY: Oahu, Chamisso collector.

DISTRIBUTION: On trunks of trees and on rocks, common; Hawaiian Islands.

ILLUSTRATIONS: Fée, Mém. Foug. **2**: *pl. 63. f. 1.* 1845; Gaud. Voy. Bonite Bot. *pl. 79. f. 1–4.* 1846.

SPECIMENS EXAMINED: Hawaii, *Wilkes Expedition* N; Oahu, *Heller 2114* C, N; *Mann & Brigham 182* N; *Robinson 27* V; *106* V; *114* V; Kauai, *Heller 2567* C, N; *Robinson 436* V; Hawaiian Islands, *Baldwin 101* C; *Hillebrand 112* C; *Wilkes Expedition* C; ex Herb. John Donnell Smith N.

ELAPHOGLOSSUM GORGONIUM (Kaulf.) Brack. Fil. U. S. Expl. Exp. 74. 1854

Acrostichum gorgonium Kaulf. Enum. 63. 1824.
Olfersia gorgonea Presl, Tent. Pterid. 235. 1836.
Aconiopteris obtusa Fée, Mém. Foug. **2**: 80. 1845.
Olfersia obtusa Moore, Ind. Fil. **1**: 17. 1857.
Aconiopteris gorgonea J. Sm. Hist. Fil. 128. 1875.
Acrostichum pellucido-marginatum Christ, Verh. Nat. Ges. Basel **11**: 255. 1895.

TYPE LOCALITY: Oahu.

DISTRIBUTION: On ground in wet woods at 600–700 m. elevation, Hawaiian Islands, Society Islands.

ILLUSTRATION: Fée, Mém. Foug. **2**: *pl. 41*. 1845.

SPECIMENS EXAMINED: Hawaii, *Mann & Brigham 286* N; Maui, *Lichtenthaler* N; *Robinson 303* V; Oahu, *Heller* C, N; *Robinson 4* V; *48* V; *Wilkes Expedition* N; Kauai, *Heller* C; *Robinson 833* V; Hawaiian Islands, *Baldwin 100* C; *Miss Sessions* C; ex Herb. Mt. Holyoke College C.

2. PTERIS L. Sp. Pl. 1073. 1753

A cosmopolitan genus of various habit. Rootstock usually creeping; leafstalk articulate; blades variously divided; sori marginal, linear, continuous upon a slender receptacle, connecting the tips of the free veins, indusiate.

Type species: *Pteris arborea* L.

Leaf blade broadly oblong, bipinnate; sterile pinnae broader than fertile pinnae, segments of former irregularly crenulate, segments of latter entire; midrib not winged. *P. excelsa.*

Leaf blade ovate to ovate-oblong, bipinnate to quadripinnate; midrib winged throughout or terminal pinnae decurrent.

Midrib winged toward the apex, the terminal pinnae decurrent; leaf pinnate; pinnae linear-lanceolate, simple, or the lowest pair often bi-tripartite. *P. cretica.*

Midrib winged throughout; leaf quadripinnate; pinnae varying from linear-lanceolate and entire to oblong and crenate-dentate. *P. irregularis.*

PTERIS EXCELSA Gaud. Voy. Freyc. Bot. 388. 1829

Pteris terminalis Wall. Cat. no. 101. 1828 (nomen).

Pteris owahuensis Presl, Tent. Pterid. 145 (nomen). 1836.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: In damp gulches at elevations of 600–900 m.; Northern India, Malaysia, and Fiji Islands.

ILLUSTRATION: Hook. Sp. Fil. **2**: 136. 1846.

SPECIMENS EXAMINED: Hawaii, *Robinson 226* V; *235* V; Maui, *Bailey* C; *Robinson 306* V; Oahu, *Forbes* BM; *Hillebrand 407* V; *Robinson 104* V; Kauai, *Heller 2649*; Hawaiian Islands, *Baldwin 18; Wilkes Expedition 11* C; *Miss Sessions* C.

PTERIS CRETICA L. Mant. 130. 1767

Pteris nervosa Thunb. Fl. Jap. 332. 1784.

Pteris serraria Sw. Jour. Bot. Schrad. **1800**[2]: 65. 1801.

Pteris pentaphylla Willd. Sp. Pl. **5**: 362. 1810.
Pteris triphylla Mart. & Gal. Mém. Acad. Brux. **15**: 51. *pl. 14. f. 1.* 1824.
Pteris scabripes Wall. Cat. no. 94. 1828.
Pteris melanocaulon Fée, Mém. Foug. **7**: 31. *pl. 19. f. 1.* 1857.
Pteris Treacheriana Baker, Jour. Bot. **17**: 65. 1879.
Pteris lomarioides Colenso, Trans. N. Z. Inst. **13**: 380. 1881.

TYPE LOCALITY: Crete.

DISTRIBUTION: On ground and on trees, tropical countries.

ILLUSTRATIONS: Mart. & Gal. Mém. Acad. Brux. **15**: 51. *pl. 14. f. 1.* 1824; Fée, Mém. Foug. **7**: 31. *pl. 19. f. 1.* 1857.

SPECIMENS EXAMINED: Maui, *Bailey* C; *Bishop* B; *Hillebrand* B; Oahu, *Heller 2782* C; *Hillebrand* B; *Robinson 22* V; *25* V; *42* V; Kauai, *Knudsen 39* B; Hawaiian Islands, *Baldwin 19* B, C.

PTERIS IRREGULARIS Kaulf. Enum. 189. 1842

Pteris alata Gaud. Voy. Freyc. Bot. 391. 1829.
Pteris regularis E. Bailey, Haw. Ferns 26. 1883.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: In woods and shady gulches 300–900 m. elevation; Hawaiian Islands.

ILLUSTRATION: Gaud. Voy. Freyc. Bot. *pl. 19.* 1829.

SPECIMENS EXAMINED: Hawaii, *Hillebrand* B, K; Maui, *Bailey* C; *Hillebrand* B; *Wilkes Expedition* C; Oahu, *Bennett 85* B; *Chamisso* C; *Forbes* BM; *Gaudichaud* B; *Heller 2335* C; *Hillebrand* B; *79* B; *Lindley* K; *Macrae* B; *Mann & Brigham 162* C; *Meyen* B; *Nuttall* K; *Robinson 12* V; *56* V; *61* V; *65* V; *116* V; Kauai, *Knudsen 40* B; *41* B; *69* B; Hawaiian Islands, *Baldwin 17* B, C; *Douglas 31* K; *Gaudichaud 184* B; *Hillebrand* K; *Knudsen 29* B; *42* B; *Miss Sessions* C; *Wilkes Expedition* C.

Bailey (Haw. Ferns 25. 1883) believed that two species had been confused under the name *P. irregularis* and sought to clear up the difficulty by describing *P. regularis*. The variations shown by leaves growing upon the same plant permit placing the several forms in one species.

3. PTERIDIUM Gleditsch, in Scop. Fl. Carn. 169. 1760

Rootstock wide-creeping; leaves distant, not articulate, triangular to deltoid-ovate, ternately compound; sorus linear, follow-

ing the vein which connects the tips of the otherwise free veins; indusium double, the outer formed from the incurved margin of the frond, the inner attached to the receptacle on the inner side and enclosed by the outer indusium, both ciliate at the margin.

Type species: *Pteris aquilina* L.

PTERIDIUM AQUILINUM (L.) Kuhn; v. Decken, Reisen Ost. Afr. Bot. 11. 1879

Pteris aquilina L. Sp. Pl. 1075. 1753.
Cincinalis aquilina Gled. Syst. Pl. 290. 1764.
Asplenium aquilinum Bernh. Jour. Bot. Schrad. **1799**[1]: 310. 1799.
Pteris psittacina Presl, Del. Prag. 185. 1822.
Pteris arachnoidea Kaulf. Enum. 190. 1824.
Allosorus aquilinus Presl, Tent. Pterid. 153. 1836.
Eupteris aquilina Newman, Phytologist **2**: 278. 1845.
Paesia aquilina Keyserl. Polyp. Cyath. Herb. Bung. 22. 1873.
Ornithopteris aquilina J. Sm. Hist. Fil. 298. 1875.

TYPE LOCALITY: Europe.

DISTRIBUTION: Common through tropics and North Temperate zones.

ILLUSTRATIONS: Diels, in E. & P. Nat. Pfl. 1[4]: 296. 1899; Waters, Ferns 93. 1903.

SPECIMENS EXAMINED: Hawaii, *Baldwin 17;* Mauna Loa, *Wilkes Expedition* C; Maui, *Bailey 40* C; Kauai, *Heller 2416* C; *40* C; Hawaiian Islands, *Baldwin 20* C, N; ex Herb. John Donnell Smith *17*.

In the Olinda woods at 1,300 m. elevation on Mt. Haleakala, Maui, plants of *Pteridium aquilinum* attain such size that it seems hardly possible that they are of the same species as the dwarfed, leathery, and resistant forms that grow upon the exposed rocks at from 2,000 m. to 3,000 m. elevation. Further study may show that they are distinct species, but for the present their differences must be considered ecological rather than taxonomic.

4. PELLAEA Link, Fil. Sp. 59. 1841

Xerophilous plants, usually found upon rocks. Rootstock short, erect; leaves cespitose, articulate; blades consisting of 1 to 3 nearly uniform leaflets; sori marginal, borne upon the ends

of unconnected veins; indusium formed by the reflexed margin of the leaf.

Type species: *Pteris atropurpurea* L.

PELLAEA TERNIFOLIA (Cav.) Link, Fil. Sp. 59. 1841

Pteris ternifolia Cav. Desc. Pl. Dem. 266. 1802.
Pteris peruviana Poir. in Lam. Encyc. **5**: 718. 1804. (Reduced to synonym in supplement.)
Pteris subverticillata Sw. Syn. Fil. 103. 1806.
Allosorus ternifolius Kunze; Klotzsch, Linnaea **20**: 339. 1847.
?*Pellaea Weddelliana* Fée, Mém. Foug. **8**: 4. 1857.
Cheilanthes ternifolia Moore, Ind. Fil. 255. 1861.
Nothochlaena ternifolia Keyserl. Polyp. Cyath. Herb. Bung. 30. 1873.

TYPE LOCALITY: Peru.

DISTRIBUTION: At elevations of 1,500 m. in dry exposed places in the mountains, Chile to Texas; Hawaiian Islands.

ILLUSTRATIONS: Hook. & Grev. Ic. Fil. **2**: *pl. 126.* 1829; Lowe, Ferns Brit. & Exot. **3**: *pl. 24b.* 1857.

SPECIMENS EXAMINED: Hawaii, *Lichtenthaler* N; *Mann & Brigham 262* N; *Safford 884* N; *Wilkes Expedition* N; Maui, *Bailey* C; *Robinson 312* V; Kauai, *Wilkes Expedition* C, N; Hawaiian Islands, *Baldwin 15* C, N; *Lindley* C; *Moore* C; *Remy 40* C; *Miss Sessions* C; ex herb. Kew Gardens C.

5. DORYOPTERIS J. Sm. Jour. Bot. Hook. **3**: 404. 1841

Rootstock short, erect; leaves cespitose, palmate or pedate, coriaceous; petiole black, polished; veins free or anastomosing, indistinct; sori marginal; indusium usually revolute with age.

Type species: *Pteris hastata* Raddi.

Leaf blades broadly deltoid; ultimate segments lanceolate.	*D. decipiens.*
Leaf blades ovate-cordate; ultimate segments linear.	*D. decora.*

DORYOPTERIS DECIPIENS (Hook.) J. Sm. Hist. Fil. 289. 1875

Pteris pedata Hook. & Arn. Bot. Beech. 107. 1832. Not Willd.
Doryopteris pedata Brack. Fil. U. S. Expl. Exp. 403. 1854.
Pteris decipiens Hook. Sp. Fil. **2**: 209. 1858.
Litobrochia decipiens Moore, Ind. Fil. 342. 1862.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: In crevices in rocks at 350 m. or more elevation, Hawaiian Islands.

ILLUSTRATION: Hook. Exot. Ferns *pl. 34.* 1858.

SPECIMENS EXAMINED: Hawaii, *Wilkes Expedition* N; Maui, *Bailey* C; *Lichtenthaler* N; Oahu, *Heller* C; *Mann & Brigham 136* N; *Wilkes Expedition* N; Hawaiian Islands, *Baldwin* C; *21* C; *Hillebrand* C; *Moore* C; ex Herb. John Donnell Smith *67* N.

DORYOPTERIS DECORA Brack. Fil. U. S. Expl. Exp. 103. 1854

Pteris decora Hook. Sp. Fil. **2**: 210. 1858.

Litobrochia decora Moore, Ind. Fil. 342. 1862.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: On exposed rocks at elevations of about 600 m., Hawaiian Islands.

ILLUSTRATION: Brack. Fil. U. S. Expl. Exp. *pl. 13. f. 1.* 1854.

SPECIMENS EXAMINED: Hawaii, *Mann & Brigham* N; *Wilkes Expedition* N; Maui, *Bailey* C; *Safford 882* N; Kauai, *Heller 2654* C, N; *Heller* C; Lanai, *Hillebrand* N; Hawaiian Islands, *Baldwin 22* C, N; *Wilkes Expedition* C.

6. ADIANTUM L. Sp. Pl. 1094. 1753

Delicate ferns, inhabiting moist, shady localities. Rootstock creeping or suberect; leafstalks slender, usually dark and lustrous, not articulate; blades pinnate to pinnately decompound or tripinnate; sori terminal upon the free forking veins within the reflexed lobes (indusia) of the leaflets.

Type species: *Adiantum Capillus-veneris* L.

ADIANTUM CAPILLUS-VENERIS L. Sp. Pl. **2**: 1096. 1753

Adiantum Capillus Sw. Jour. Bot. Schrad. **1800**^{2}: 83. 1801.

Adiantum emarginatum Bory; Willd. Sp. Pl. **5**: 449. 1810.

Adiantum Wattii Baker, Jour. Linn. Soc. **18**: 381. 1881.

Adiantum Levingei Baker, Ann. Bot. **5**: 207. 1891.

TYPE LOCALITY: Southern Europe.

DISTRIBUTION: On ground or moist rocks in tropics and subtropics.

ILLUSTRATIONS: Hook. Brit. Ferns 41. 1861; Ettingsh. Farnkr. 44. *f. 5. 11–17.* 1865.

SPECIMENS EXAMINED: Hawaii, *Wilkes Expedition* N; Maui, *Bailey 41* C; Oahu, *Hitchcock* C; *Lichtenthaler* N; *Mann & Brigham* N; *Remy 241* B; *Robinson* V; *Safford 880* N; Kauai, *Forbes 306* BM; *Heller 2479* C, N; Hawaiian Islands, *Baldwin 14* B, C; *Moore* C; *Miss Sessions* C; *Wilkes Expedition 5* B.

SPECIES INQUIRENDA

Adiantum Bennettii Carruth. in Seeman, Fl. Vit. 346. 1873

Hillebrand states that a specimen of this plant collected by Lieut. Strickland is in the herbarium of the British Museum, but it cannot be found there at the present time (1911).

7. HYPOLEPIS Bernh. Neues Jour. Bot. Schrad. 1^2: 34. 1806

Rootstock slender, wide-creeping; leaves pinnate to quadripinnate, herbaceous, hairy; leafstalk not articulate; veins free; sori borne in the sinuses of the segments; indusium formed by the small reflexed marginal lobe of the leaf.

Type species: *Lonchitis tenuifolia* Forst.

Leaf blade quadripinnate; petiole brownish at base, stramineous above; intervals on rootstock between leaves about 12 cm. *H. punctata.*

Leaf blade bipinnate; leafstalk purplish red; intervals on rootstock between leaves 4-6 cm. *H. flaccida.*

HYPOLEPIS PUNCTATA (Thunb.) Mett. in Kuhn, Fil. Afr. 120. 1868

Polypodium punctatum Thunb. Fl. Jap. 337. 1784. Not Swartz.
Polypodium Paepigii Kunze; Klotzsch, Linnaea **9**: 50. 1834.
Phegopteris punctata Mett. Ann. Lugd. Bat. **1**: 222. 1864.
Phegopteris punctata var. *glabra* Hilleb. Fl. Haw. Is. 562. 1888.
Hypolepis tenuifolia Underw. in Heller, Minn. Bot. Stud. **1**: 782. 1897.
Nephrodium punctatum Diels in E. & P. Nat. Pfl. 1^4: 177. 1899.

TYPE LOCALITY: Japan.

DISTRIBUTION: Japan, China, Malaysia, Polynesia, Australia, New Zealand, Hawaiian Islands.

SPECIMENS EXAMINED: *Heller 2778* C.

H. tenuifolia (Forst.) Bernh. and *H. punctata* Mett. may be synonyms, though the term "arborescens" in Forster's original

description does not apply to the Hawaiian plant nor to the plants from Japan, China, and the South Pacific Islands, which are labeled "*Hypolepis tenuifolia*" in herbaria.

Hypolepis flaccida (Hilleb.) comb. nov.

Phegopteris punctata var. *flaccida* Hilleb. Fl. Haw. Is. 563. 1888.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: Hawaiian Islands.

SPECIMENS EXAMINED: *Baldwin 80* C, V.

8. SCHIZOSTEGE Hilleb. Fl. Haw. Is. 631. 1888

Rootstock erect; leaves clustered, bipinnate at the base, bipinnatifid above, cyatheoid; sori oblong, marginal upon the T-shaped expansions of the veins, which occasionally anastomose; indusium coriaceous.

Type species: *Schizostege Lydgatei* Hilleb.

SCHIZOSTEGE LYDGATEI (Bak.) Hilleb. Fl. Haw. Is. 632. 1888

Cheilanthes Lidgatii Baker; Hook. & Baker, Syn. Fil. 475. 1874.
Pteris Lydgatei Christ, Farnkr. Erde 167. 1897.

TYPE LOCALITY: Oahu.

DISTRIBUTION: On ground, Oahu and Maui, Hawaiian Islands.

ILLUSTRATION: PLATE 41.

SPECIMENS EXAMINED: Maui, Gulch of Waihee, *Hillebrand* B; Oahu, Valley of Wailupe, *Lydgate & W. F. Hillebrand* B; Koolaulua Mts., between Punahua and Kaipaupau, *Forbes* BM.

The specimens noted above are the only collections of this species that have been recorded, and an interval of about twenty-five years elapsed between the collections made upon Oahu.

The habit of *Schizostege* closely resembles that of *Pteris biaurita* L., but the relation is no closer than that of *Cheilanthes* to *Pteris* or of *Pellaea* to *Cheilanthes*.

Schizostege was a monotypic Hawaiian genus until Copeland (Philip. Jour. Sci. 1: Suppl. 2. 1906) described two Philippine species, *S. pachysora* and *S. calocarpa*, both of which he states resemble *Cheilanthes* to a greater extent than they resemble *Pteris*.

9. DIELLIA Brack. Fil. U. S. Expl. Exp. 217. 1854

Rootstock short; leaves cespitose; veins forking, uniting to form oblique areolae, free at the margin of the leaf or united by a transverse vein upon which the sporangia are borne; sori distinct; indusium linear-oblong, parallel to the margin of the leaf and opening outward.

Type species: *Diellia erecta* Brack.

Leaf blades pinnate.
- Leafstalk and midrib smooth.
  - Pinnae not more than 3 mm. broad, linear, zigzag from the alternate crenations of the margin. — *D. centifolia.*
  - Pinnae more than 3 mm. broad.
    - Leaf 8–10 cm. high, coriaceous; pinnae rhomboid-ovate above, orbicular below. — *D. pumila.*
    - Leaf more than 10 cm. high, chartaceous; pinnae lanceolate, auricular. — *D. erecta.*
- Leafstalk and midrib scaly.
  - Pinnae cut into cuneiform segments. — *D. Alexandri.*
  - Pinnae not cut into cuneiform segments.
    - Pinnae lanceolate, acute, repand. — *D. falcata.*
    - Pinnae deltoid-lanceolate, caudate, laciniate. — *D. laciniata.*

Leaf blades tripinnatifid to quadripinnate.
- Blades tripinnatifid, 6–7-jugate. — *D. Knudsenii.*
- Blades quadripinnatifid, 40–50-jugate. — *D. Mannii.*

Diellia centifolia (Hilleb.) comb. nov.

Lindsaya centifolia Hilleb. Fl. Haw. Is. 621. 1888.

TYPE LOCALITY: Halemanu, Kauai.

DISTRIBUTION: Known from type locality only.

ILLUSTRATION: Diels in E. & P. Nat. Pfl. 1^4: 211. *f. 114D.* 1899.

SPECIMENS EXAMINED: Kauai, *Knudsen 35* (type) B.

It seems possible that *Diellia centifolia* may have arisen from a cross between *Diellia falcata* and *Diellia Alexandri*, by which it inherited the position of the sori from the former parent and the modified form of the pinnae from the latter parent.

DIELLIA PUMILA Brack. Fil. U. S. Expl. Exp. 219. 1888

TYPE LOCALITY: Oahu.

DISTRIBUTION: In crevices of rocks, rare; Oahu, Hawaiian Islands.

SPECIMENS EXAMINED: Oahu, *Hillebrand* B; Nuuanu Valley, Oahu, *Hillebrand* B.

This species is represented at Kew by *Wilkes Expedition 2*, which is probably a cotype if not the type specimen.

DIELLIA ERECTA Brack. Fil. U. S. Expl. Exp. 218. 1854

TYPE LOCALITY: Mountain forest, Western division of Maui.

DISTRIBUTION: Hawaiian Islands.

ILLUSTRATION: Brack. Fil. U. S. Expl. Exp. *pl. 31. f. 2.* 1854.

SPECIMENS EXAMINED: Maui, *Baker* C; *Baldwin* B; *Hillebrand* B; Kauai, *Van Ingen* C; Hawaiian Islands, *Baldwin 28* B; *Moore* B; ex Herb. Lindley C.

DIELLIA ALEXANDRI (Hilleb.) Diels in E. & P. Nat. Pfl. 1^4: 212. 1899

Lindsaya Alexandri Hilleb. Fl. Haw. Is. 622. 1888.

TYPE LOCALITY: Halemanu, Kauai.

DISTRIBUTION: Known from type locality only.

ILLUSTRATION: Diels in E. & P. Nat. Pfl. 1^4: 211. *f. 114G, H.* 1899.

SPECIMENS EXAMINED: Kauai, *Knudsen* B; Maui, *Baldwin* C, V; Hawaiian Islands, *Baldwin 12* C.

DIELLIA FALCATA Brack. Fil. U. S. Expl. Exp. 219. 1854

TYPE LOCALITY: Kaala Mountains, Oahu.

DISTRIBUTION: On dry, open ridges, Hawaiian Islands.

ILLUSTRATION: Brack. Fil. U. S. Expl. Exp. *pl. 31. f. 1.* 1854.

SPECIMENS EXAMINED: Maui, *Hillebrand* B; Oahu, *Hillebrand* B; Kauai, *Van Ingen* C; Hawaiian Islands, *Baldwin 29* C.

Diellia laciniata (Hilleb.) comb. nov.

Lindsaya laciniata Hilleb. Fl. Haw. Is. 621. 1888.

TYPE LOCALITY: Halemanu, Kauai.

DISTRIBUTION: Known from type locality only.

ILLUSTRATION: Diels in E. & P. Nat. Pfl. 1^4: 211. *f. 114E, F.* 1899.

SPECIMENS EXAMINED: Halemanu, Kauai, *Knudsen* B.

Hillebrand's β variety *subbipinnata* has more symmetrical

pinnae than the type. His variety γ, as represented in the Berlin herbarium, is a monstrosity.

DIELLIA KNUDSENII (Hilleb.) Diels in E. & P. Nat. Pfl. 1[4]: 212. 1899

Lindsaya Knudsenii Hilleb. Fl. Haw. Is. 623. 1888.

TYPE LOCALITY: Halemanu, Kauai.

DISTRIBUTION: Known from Hawaiian Islands only.

ILLUSTRATIONS: Diels in E. & P. Nat. Pfl. 1[4]: 212. *f. 114L–N.* 1899.

SPECIMENS EXAMINED: Kauai, *Knudsen 19* (type) B.

Diellia Mannii (Hilleb.) comb. nov.

Microlepia Mannii D. C. Eaton in Mann, Proc. Am. Acad. 7: 212. 1867.

Davallia Mannii Baker in Hook. & Baker, Syn. Fil. ed. 2. 471. 1874.

Lindsaya Mannii Hilleb. Fl. Haw. Is. 624. 1888.

Humata Mannii Diels in E. & P. Nat. Pfl. 1[4]: 209. 1899.

TYPE LOCALITY: Kauai.

DISTRIBUTION: Hawaiian Islands.

SPECIMENS EXAMINED: Maui, *Bishop* B; Kauai, *Baldwin 10* B, C; *Forbes 333* BM; *Knudsen 38* B; *Mann & Brigham 546* B; Hawaiian Islands, *Baldwin* V.

10. ODONTOLOMA J. Sm. Jour. Bot. Hook. 3: 415. 1841

Rootstock creeping, slender, scaly, much branching; leafstalk not articulate; blades membranaceous, dimidiate; veins forking, free or united in pairs at their apices; sori submarginal, discrete; indusium attached by a broad base, free laterally and apically, opening outward.

Type species: *Odontoloma pulchella* J. Sm.

ODONTOLOMA MACRAEANUM (Hook. & Arn.) Brack. Fil. U. S. Expl. Exp. 226. 1854

Davallia Macraeana Hook. & Arn. Bot. Beech. Voy. 108. 1832.

Acrophorus repens Moore, Ind. Fil. 91. 1857.

Acrophorus Macraeanus Carruth. in Seeman, Fl. Vit. 336. 1869.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: Hawaiian Islands, common.

ILLUSTRATION: Hook. & Grev. Ic. Fil. *pl. 143*. 1829.

SPECIMENS EXAMINED: Hawaii, *Wilkes Expedition* C; Maui, *Baldwin* B; *Baldwin 7* B; *Robinson 203* V; *367* V; *369* V; Oahu, *Forbes* BM; (Honolulu) *Hillebrand* C; (Konhuanui) *Hillebrand* B; (Nuuanu) *Hillebrand* B; *Macrae* B; *Robinson 163* V; *193* V; *613* V; *Wilkes Expedition* C; Kauai, *Robinson 427* V; *433* V; *437* V; *499* V; *Remy* C; Hawaiian Islands, *Baldwin* B; *Gaudichaud* B; *Wilkes Expedition* B.

Odontoloma Macraeanum differs from *Lindsaya repens* in that the sori are submarginal rather than marginal, as they are in the latter, and are discrete rather than confluent. Superficially they are much alike.

11. NEPHROLEPIS Schott, Gen. Fil. *pl. 3*. 1834

Terrestrial or epiphytic plants, mainly found in the tropics; rhizome creeping or suberect; leafstalk not articulate; blades pinnate, usually coriaceous, spreading or pendent; pinnae approximate, articulate; veins free, forked, each terminating in a punctiform apex, which bears a calcareous scale on the outer side; sori borne apically upon the upper branch of a vein, thus forming a single row parallel to the midrib; indusium circular or reniform.

Type species: *Nephrolepis exaltata* (L.) Schott.

Rootstock bearing tubers; indusium opening toward apex of pinna. *N. cordifolia.*
Rootstock without tubers; indusium opening obliquely toward margin of pinna. *N. exaltata.*

NEPHROLEPIS CORDIFOLIA (L.) Presl, Tent. Pterid. 79. 1836

Polypodium cordifolium L. Sp. Pl. 1089. 1753.
Aspidium cordifolium Sw. Jour. Bot. Schrad. **1800**[2]: 32. 1801.
Aspidium undulatum Afz.; Sw. Jour. Bot. Schrad. **1800**[2]: 32. 1801.
Aspidium tuberosum Bory in Willd. Sp. Pl. **5**: 234. 1810.
Nephrolepis tuberosa Presl, Tent. Pterid. 79. 1836.
Nephrolepis pendula J. Sm. Jour. Bot. Hook. **4**: 197. 1842.

TYPE LOCALITY: West Indies.

DISTRIBUTION: On ground and on trees; tropical countries, Japan, New Zealand.

ILLUSTRATIONS: Raddi, Pl. Bras. **1**: *pl. 46*. 1825; Diels in E. & P. Nat. Pfl. **1**[4]: 205. *f. 111*. 1899.

SPECIMENS EXAMINED: Hawaii, *Robinson 225* V; *Forbes 291* BM.

Mr. J. F. Rock, botanist of the Forestry Station of the Hawaiian Department of Agriculture, reports having found *N. cordifolia* (L.) Presl [*N. tuberosa* (Bory) Presl] on Punaluu Trail above Kaliiuao, Oahu, on Mr. James Castle's place. He also says that he has specimens of the same plant in his herbarium, which were collected by Mr. Lyons, a missionary on the islands, about fifty years ago.

N. cordifolia, introduced into the Hawaiian Islands from Japan, is used as a border plant in gardens.

NEPHROLEPIS EXALTATA (L.) Schott, Gen. Fil. *pl. 3.* 1834

Polypodium exaltatum L. Syst. ed. 10[2]: 1326. 1759.
Aspidium exaltatum Sw. Jour. Bot. Schrad. **1800**[2]: 32. 1801.
Nephrodium exaltatum R. Br. Prod. Fl. N. Holl. 148. 1810.
Aspidium Schkuhrii Bl. Enum. Fil. Jav. 147. 1828.
Nephrolepis cultrifolia Presl, Tent. Pterid. 79. 1836.

TYPE LOCALITY: Jamaica.

DISTRIBUTION: Epiphytic on trees; common in tropical countries.

ILLUSTRATIONS: Plumier, Fil. Am. *pl. 63.* 1703; Sloane, Hist. Jam. **1**: *pl. 31.* 1707; Schkuhr, Krypt. Gew. *pl. 32b.* 1809 (not Mett. Fil. Hort. Lips. *pl. 26. f. 1–5.* 1856); Raddi, Pl. Bras. **1**: *pl. 46.* 1825.

SPECIMENS EXAMINED: Hawaii, *Wilkes Expedition* C; Maui, *Robinson 305* V; Oahu, *Chamisso* B; *Heller 1987* C; *Macrae* B; *Meyen* B; Kauai, *Heller 2873* C; *Kuntze 23041* C; *Robinson 6* V; *154* V; *423* V; *425* V; Hawaiian Islands, *Baldwin 73* C; *Gaudichaud* B, C; *Miss Sessions* C.

12. ODONTOSORIA Presl, Tent. Pterid. 129. 1836

Rootstock short, creeping; leafstalks not articulate; blades 2–3-pinnate; ultimate divisions cuneate, usually truncate; veins simple or forked, if sterile, punctiform at the apex. Sori apical or subapical; indusium semiorbicular, attached at the base and sides, truncate at the apex.

Type species: *Davallia biflora* Kaulf.

ODONTOSORIA CHINENSIS J. Sm. Bot. Voy. Herald 430. 1857

Trichomanes chinensis L. Sp. Pl. 1099. 1753.
Adiantum chusanum L. Sp. Pl. 1095. 1753.
Adiantum chinense Burm. Fl. Ind. 236. 1768.
Trichomanes cuneiforme Forst. Prod. 330. 1786.
Davallia chinensis J. E. Sm. Mém. Acad. Turin **5**: 414. 1793.
Davallia chusana Willd. Sp. Pl. **5**: 414. 1793.
Davallia tenuifolia Sw. Jour. Bot. Schrad. **1800**^{2}: 88. 1801.
Adiantum tenuifolium Poir. in Lam. Encyc. **1**: 44. 1810.
Davallia remota Kaulf. Enum. 223. 1824.
Microlepia tenuifolia Mett. Fil. Lips. 104. 1856.
Stenoloma tenuifolium Fée, Gen. Fil. 330. 1852.
Lindsaya chinensis Mett. in Kuhn, Fil. Afr. 67. 1868.

TYPE LOCALITY: Bojei, Mauritius.

DISTRIBUTION: Tropical countries.

ILLUSTRATIONS: Mett. Fil. Lips. *pl. 27. f. 1–4.* 1856.

SPECIMENS EXAMINED: Hawaii, *Kuntze 1904* C; *23089* C; *Robinson* V; Maui, *Bailey* C; Oahu, *Capt. Haines* B, C; *Heller 2327* C; *2328* C; *Robinson 3* V; *25* V; *165* V; *Knudsen 16* B; *Wilkes Expedition 13* B; Kauai, *Kuntze 23034* C; Molokai, *Hillebrand* B; Hawaiian Islands, *Baldwin 11* B, C; *Chamisso* B; *Gaudichaud* B; *Miss Sessions* C; *Wilkes Expedition* C.

13. MICROLEPIA Presl, Tent. Pterid. 124. 1836

Rootstock slender, creeping; leafstalk not articulate; blades various in size and texture; veins free, once or more than once forked; sori cup-shaped, upon a tooth or a sinus; indusium membranaceous, attached at sides and base, opening outward.

Type species: *Microlepia brasiliensis* Presl.

Leaf blade bipinnate, coriaceous, paleaceous.	*M. strigosa.*
Leaf blade tripinnate, chartaceous, glabrate.	*M. Speluncae.*

MICROLEPIA STRIGOSA (Thunb.) Presl. Epim. 95. 1849

Trichomanes strigosum Thunb. Fl. Jap. 339. 1784.
Dicksonia strigosa Thunb. Trans. Linn. Soc. **2**: 341. 1794.
Dicksonia japonica Sw. Jour. Bot. Schrad. **1800**^{2}: 92. 1801.
Davallia polypodioides Don, Prod. Fl. Nepal. 10. 1825.
Microlepia cristata J. Sm. Jour. Bot. Hook. **3**: 416. 1841.

Davallia strigosa (Sw.) Kunze, Bot. Zeit. **6**: 542. 1848.
Microlepia Khasiyana Presl, Epim. 95. 1849.
Microlepia japonica Presl, Epim. 95. 1849.
Davallia Khasiyana Hook. Sp. Fil. **1**: 173. 1856.
Dennstaedtia strigosa J. Sm. Hist. Fil. 265. 1875.

TYPE LOCALITY: Japan.

DISTRIBUTION: Tropics and subtropics, common.

ILLUSTRATIONS: Hook. Sp. Fil. **1**: *pl. 47A, 57A*. 1856.

SPECIMENS EXAMINED: Hawaii, *Robinson 253* V; *261* V; Maui, *Baldwin* B; *Robinson 356* V; Oahu, *Beechey* C; *Heller 2012* C; *2327* C; *Meyen* B; *Wilkes Expedition* B, C; Kauai, *Forbes 423* BM; *Heller 2480* C; *2803* C; Molokai, *Hillebrand* B; Hawaiian Islands, *Baldwin 8* B, C; *Miss Sessions* C.

The specimens vary as to the amount of pubescence, those collected in certain very moist localities, such as the Olao woods (*Robinson 253* V, *261* V), being much more furfuraceous than those collected in drier localities, as *Heller 2803*. The variation from narrowly to broadly lanceolate is not correlated with this, nor is there any correspondence in size with the greater size of *Microlepia hirta*, hence Hillebrand's variety *hirta* may be disregarded.

MICROLEPIA SPELUNCAE Moore, Ind. Fil. 93. 1857

Polypodium Speluncae L. Sp. Pl. 1093. 1753.
Davallia flaccida R. Br. Prod. Fl. N. Holl. 157. 1810.
Aspidium Speluncae Willd. Sp. Pl. **5**: 269. 1810.
Microlepia polypodioides Presl, Tent. Pterid. 125. 1836.
Microlepia flaccida J. Sm. Jour. Bot. Hook. **1**: 427. 1842.
Davallia Speluncae Baker in Hook. & Baker, Syn. Fil. 100. 1867.

TYPE LOCALITY: India.

DISTRIBUTION: Tropics and subtropics.

ILLUSTRATION: Pluk. Phytog. *pl. 244. f. 2*. 1692.

SPECIMENS EXAMINED: Hawaii, *Hillebrand* B; Maui, *Bailey* C; Oahu, *Heller 2072* C; *Hillebrand* B; *Robinson* V; Kauai, *Heller 2650* C; Hawaiian Islands, *Baldwin* B, C; *Miss Sessions* C.

14. VITTARIA J. E. Smith, Mém. Acad. Turin **5**: 413. *pl. 9. f. 5*. 1793

Epiphytic plants of tropical regions; rootstock slender, creeping, scaly; leaves clustered, linear, grasslike, sessile or short-

stalked, articulate; veins anastomosing to form a single row of areolae on either side of the midvein; sorus upon a linear receptacle formed by a marginal or intramarginal groove on each side of the leaf, non-indusiate.

Type species: *Pteris lineata* L.

VITTARIA RIGIDA Kaulf. Enum. 193. 1824

TYPE LOCALITY: Oahu.

DISTRIBUTION: On trees, Polynesia.

SPECIMENS EXAMINED: Hawaii, *Robinson 204* V; *252* V; Oahu, *Chamisso* B; *Heller 2054* C; *2532* C; *Robinson 152* V; *521* V; *522* V; Kauai, *Kuntze 23039* C; Hawaiian Islands, *Baldwin 96* C; *Lindley* C; *Wilkes Expedition 3* C; *Moore* C.

This is the species wrongly referred by Hillebrand to *V. elongata* Sw. (Hilleb. Fl. Haw. Is. 551. 1888), the type of which is from India. In the Indian plants the ventral lip of the sorus is shorter than the lateral lip, so that the sporangia are invisible, and the leaves are nearly three times as long as those of the Hawaiian plants.

15. FILIX Adans. Fam. Pl. 20. 1763

Delicate rock ferns, found mainly in temperate regions. Rootstock short, erect; leaves clustered, not articulate; sori medial, subglobose; indusium attached by a broad base on the inner side, free above, soon reflexed.

Type species: *Polypodium bulbiferum* L.

Filix Douglasii (Hook.) comb. nov.

Cystopteris Douglasii Hook. Sp. Fil. 1: 200. 1846.
Cystopteris sandwichensis Brack. Fil. U. S. Expl. Exp. 234. 1854.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: Hawaiian Islands.

ILLUSTRATION: Hook. Cent. Ferns *pl. 55*. 1854.

SPECIMENS EXAMINED: Hawaii, *Wilkes Expedition* N, Herb. D. C. Eaton; Maui, *Wilkes Expedition* N; *Hillebrand* B; *Lichtenthaler* N; *Mann & Brigham* N; Oahu, *Hillebrand* B; Hawaiian Islands, *Baldwin* C; *Brackenridge* N.

16. CEROPTERIS Link, Fil. Sp. 141. 1841

Rootstock creeping or short oblique, covered with brown, linear-lanceolate scales; leaves cespitose; leafstalks not articulate; blades bipinnate to tripinnate, covered below with a waxy powder; veins free; sori following the course of the veins, non-indusiate.

Type species: *Acrostichum calomelanos* L.

Leaf blades bipinnate with a pinnatifid apex; powder on lower surface yellow. *C. ochracea.*

Leaf blades tripinnate; powder on lower surface white. *C. calomelanos.*

Ceropteris ochracea (Presl) comb. nov.

Gymnogramme tartarea var. β Hook. & Baker, Syn. Fil. 384. 1867.

TYPE LOCALITY: South America.

DISTRIBUTION: In moist thickets, tropical America, Costa Rica, Natal, and Hawaiian Islands.

SPECIMENS EXAMINED: Oahu, *Forbes* BM; *Robinson* V.

Mr. C. N. Forbes notes: "I find the species to be widely spread over the whole group (Hawaiian Islands), especially along the irrigation ditches. The golden variety is much less common than the silver."

This fern has been reported from the Philippines, where it has been thought to be an escape.

CEROPTERIS CALOMELANOS (L.) Link, Fil. Sp. 141. 1841.
(As *C. calomelaena*)

Acrostichum calomelanos L. Sp. Pl. 1072. 1753.

Gymnogramma calomelanos Kaulf. Enum. Fil. 76. 1824.

Neurogramme calomelanos Diels in E. & P. Nat. Pfl. 1^4: 264. 1899.

TYPE LOCALITY: West Indies.

DISTRIBUTION: In open places, in wet ground, West Indies, South America, Hawaiian Islands.

ILLUSTRATIONS: Plumier, Traité Foug. *pl. 40.* 1705; Sloane Hist. Jam. *pl. 30. f. 2.* 1735.

SPECIMENS EXAMINED: Oahu, *Forbes 1* BM; *Robinson* V.

17. CONIOGRAMME Fée, Mém. Foug. **5**: 167. 1852

Mostly terrestrial plants. Rootstock creeping; leaves not articulate, pinnate or bipinnate, light green, glabrous, or slightly

pubescent beneath, chartaceous; veins free, 1–3-forked; sori linear, continuous upon the veins and forking with them, non-indusiate.

CONIOGRAMME FRAXINEA (Don) Diels in E. & P. Nat. Pfl. 1^4: 262. 1899

Diplazium fraxineum Don, Prod. Fl. Nepal. 12. 1825.

Gymnogramme pilosa Brack. Fil. U. S. Expl. Exp. 22. 1854. Not Mart. & Gal. 1842.

Gymnogramme javanica Hook. Syn. Fil. 381. 1867. Not Blume 1828.

TYPE LOCALITY: Nepal.

DISTRIBUTION: In wet woods at 900–1,200 m. elevation, Hawaiian Islands.

ILLUSTRATION: Brack. Fil. U. S. Expl. Exp. *pl. 4. f. 1.* 1854.

SPECIMENS EXAMINED: Hawaii, *Hillebrand* B; *Robinson 200* V; *Wilkes Expedition* N; Maui, *Bishop 68* B; *Hillebrand* B; *Mann & Brigham 486* N; *Robinson 314* V; *358* V; Oahu, *Robinson 44* V; *53* V; Kauai, *Forbes* BM; *Heller 2637* C, N; *Knudsen 100* B; *Lichtenthaler* N; Hawaiian Islands, *Baldwin 95* C, N; *Wilkes Expedition* N.

18. DRYOPTERIS Adans. Fam. Pl. 2: 20. 1763

Rootstock erect or creeping, usually short; leafstalk not articulate; blade pinnate to quadripinnate; veins free or those in adjacent lobes connate; sori round to elliptical; indusium, if present, usually reniform, with narrow sinus.

Type species: *Polypodium Filix-mas* L. Sp. Pl. 1090. 1753.

Veins free.
- Indusium present.
  - Leaf blades bipinnatifid; basal pinnae reduced.
    - Under surface paleaceous with whitish hairs mingled with resinous dots. — *D. globulifera.*
    - Under surface densely covered, at least as to leafstalk and midribs, with linear-lanceolate, long-acuminate scales.
      - Blades coriaceous; scales light brown; veins more than once forking. — *D. paleacea.*
      - Blades chartaceous; scales dark brown; veins simple or once forking. — *D. fusco-atra.*
  - Leaf blades bipinnate to quadripinnatifid; basal pinnae not reduced.

Under surface smooth.
Blades bipinnate above, tripinnatifid below, deltoid. *D. nuda.*
Blades tripinnate above, quadripinnatifid below, deltoid-ovate. *D. glabra.*
Under surface glandular or scaly.
Under surface glandular.
Blades cordate-ovate (20–40 cm. × 16–32 cm.); sori marginal. *D. latifrons.*
Blades oblong-lanceolate (10–25 cm. × 4.5–8 cm.); sori medial. *D. parvula.*
Under surface scaly.
Blades bipinnate; paleaceous with light brown scales.
Leafstalk and midrib densely covered with ferruginous scales, leaf deltoid. *D. squamigera.*
Leafstalk and midrib sparsely covered with brown, membranaceous scales, leaf lanceolate. *D. hawaiiensis.*
Blades tripinnate; paleaceous with dark brown or black linear scales. *D. rubiginosa.*
Indusium wanting.
Blades tripinnatifid to tripinnate.
Midribs covered with abundant dark fibrillose scales.
Blades coriaceous, punctate, with scattered resinous granules on their lower surfaces. *D. honolulensis.*
Blades chartaceous with no resinous granules. *D. crinalis.*
Midribs smooth or merely pubescent with whitish hairs.
Pinnules linear-lanceolate, acuminate, 1 cm. or more apart; leafstalk stramineous. *D. Keraudreniana.*
Pinnules oblong, obtuse, closely set; leafstalk reddish brown. *D. rubiformis.*
Blades quadripinnatifid to quadripinnate.
Ultimate segments sharply toothed, primary and secondary midribs purplish, scaly. *D. acutidens.*
Ultimate segments entire or with appressed teeth, midribs stramineous, smooth or fibrillose.
Basal scales of leafstalk mahogany-colored, spreading; sori submarginal. *D. unidentata.*
Basal scales of leafstalk pale, appressed; sori medial. *D. sandwicensis.*
Veins connate.
Leaf blades pinnate, under surface covered with resinous glands; sori submarginal; indusium present. *D. propinqua.*

Leaf blades pinnate to bipinnatifid, under surface without resinous glands; sori variously placed; indusium present or wanting.
Indusium present.
Leaf blades bipinnatifid; basal pinnae reduced; under surface paleaceous with whitish hairs; sori medial upon secondary veins. *D. parasitica.*
Leaf blades pinnate; basal pinnae not reduced; under surface smooth; sori at base of secondary veins, forming a row on either side of primary veins. *D. cyatheoides.*
Indusium absent or fugacious.
Indusium absent; leaf blades pinnate; under surface hairy as to veins and sori. *D. stegnogrammoides.*
Indusium fugacious; leaf blades bipinnatifid; under surface not hairy. *D. truncata.*

DRYOPTERIS GLOBULIFERA (Brack.) Kuntze, Rev. Gen. Pl. **2**: 812. 1891

Lastraea globulifera Brack. Fil. U. S. Expl. Exp. 194. 1854.
Nephrodium globuliferum Hook. Sp. Fil. **4**: 96. 1862.
Aspidium globuliferum Hilleb. Fl. Haw. Is. 573. 1888.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: At elevations of 1,200–1,500 m., Hawaiian Islands.

SPECIMENS EXAMINED: Hawaii, *Robinson 607* V; *Wilkes Expedition* N; *Hillebrand* B, C; Maui, *Bailey* C; *Bishop* B; *Hillebrand* B; Oahu, *Lichtenthaler* N; *Robinson 67* V; *89* V; *525* V; Hawaiian Islands, *Baldwin 67* C, N; *Gaudichaud* B; *Hillebrand* C; Kauai (var. *bipinnata*), *Hillebrand 53* B.

Dryopteris paleacea (Sw.) comb. nov.

Aspidium paleaceum Sw. Syn. Fil. 52. 1806.
Aspidium parallelogrammum Kunze, Linnaea **13**: 146. 1839.
Dichasium parallelogrammum Fée, Mém. Foug. **5**: 303. *pl. 23.* 1852.
Lastraea truncata Brack. Fil. U. S. Expl. Exp. 195. *pl. 27.* 1854.

TYPE LOCALITY: Peru, South America.

DISTRIBUTION: On ground at lower elevations; Mexico to Peru; Hawaiian Islands.

ILLUSTRATION: Fée, Mém. Foug. **5**: *pl. 23.* 1852.

SPECIMENS EXAMINED: Hawaii, *Robinson 618* V; *Wilkes Expe-*

dition; Maui, *Bailey* C; *Hillebrand* B; *Robinson 385* V; Oahu, *Gaudichaud* B; *Lichtenthaler* N; Kauai, *Bishop* BM; *Forbes 444* BM; *Heller 2749* C, N; Hawaiian Islands, *Baldwin 65* C, N.

Dryopteris paleacea is closely allied to the widely distributed *Dryopteris Filix-mas*, but the crowded pinnae, the truncate form of the pinnules, the form and number of the scales of the rachis distinguish it from the more lax and open form of the latter.

Dryopteris fusco-atra (Hilleb.) comb. nov.

Aspidium Filix-mas var. *fusco-atrum* Hilleb. Fl. Haw. Is. 575. 1888.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: At high elevations, Hawaiian Islands.

ILLUSTRATION: PLATE 42.

SPECIMENS EXAMINED: Maui, *Hillebrand 24* B; Oahu, *Forbes* BM; Kauai, *Bishop* B; *Heller 2589* C, N; *2746* C; *Hillebrand* C; Hawaiian Islands, *Baldwin* B; *Hillebrand 24* B; *Mann & Brigham 255* N; *Miss Sessions* C.

The lax character of the leaves and the dark color of the scales are excellent field marks by which to distinguish this fern from *Dryopteris paleacea*.

DRYOPTERIS NUDA Underw. in Heller, Minn. Bot. Stud. **1**: 780. 1896

Aspidium glabrum Hilleb. Fl. Haw. Is. 576. 1888. (Not Mett.)

TYPE LOCALITY: Kauai.

DISTRIBUTION: Hawaiian Islands.

ILLUSTRATION: PLATE 43.

SPECIMENS EXAMINED: Hawaii, *Robinson 251* V; Maui, *Bishop* B; *Hillebrand* B; *Robinson 335* V; *339* V; *393* V; Oahu, *Baldwin* B; *Hillebrand* B; *Robinson 198* V; Kauai *Heller 2750* (type) C; *Hillebrand* B; *Robinson 818* V.

This fern strongly resembles *Dryopteris spinulosa* but is a much more compact, rigid form and has more acute ultimate divisions.

DRYOPTERIS GLABRA (Brack.) Kuntze, Rev. Gen. Pl. **2**: 812. 1891

Lastraea glabra Brack. Fil. U. S. Expl. Exp. 200. 1854.

Aspidium glabrum Mett. Aspid. 59. 1858.

Aspidium glabrum var. *quadripinnatum* Hilleb. Fl. Haw. Is. 576. 1888.

TYPE LOCALITY: Hawaii.

DISTRIBUTION: High forests, Hawaiian Islands.

SPECIMENS EXAMINED: Hawaii, *Wilkes Expedition* N; *Robinson 268* V; *627* V; Maui, *Bailey* C; *Lindley* C; *Robinson 374* V; *397* V; Oahu, *Halerman 63* B; Kauai, *Robinson 421* V.

Wilkes's specimen in the National Herbarium is labeled "sp. nov.," hence it is probably a cotype if not his type of Brackenridge's *Lastraea glabra*.

This is a much more graceful fern than *Dryopteris nuda*, which has been confused with it by some authors.

DRYOPTERIS LATIFRONS (Brack.) Kuntze, Rev. Gen. Pl. **2**: 813. 1891

Lastraea latifrons Brack. Fil. U. S. Expl. Exp. 196. 1854.
Nephrodium latifrons Hooker, Sp. Fil. **4**: 138. 1862.
Aspidium latifrons Mann, Proc. Am. Acad. **7**: 217. 1868.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: Common at elevations of 600–1,200 m., Hawaiian Islands.

SPECIMENS EXAMINED: Maui, *Bailey* C; Lanai, *Hillebrand* B; Molokai, *Hillebrand* B; Oahu, *Forbes 1082* BM; *Heller 2899* C, N; *Lichtenthaler* N; *Mann & Brigham 189, 195, 196* N; *Macrae* C; *Robinson 93* V; *172* V; *182* V; *Wilkes Expedition* N; Hawaiian Islands, *Baldwin 69* B, C, N; *129* B; *Gaudichaud* B; *Van Ingen* C; ex herb. Kew C; ex Herb. John Donnell Smith *623* N; *624* N.

Dryopteris parvula sp. nov.

Aspidium glabrum var. *pusillum* Hilleb. Fl. Haw. Is. 577. 1888.

Not *Dryopteris pusilla* (Mett.) Kuntze.

Caudex short, oblique, covered with linear-lanceolate, light brown scales 7–10 mm. long; leafstalk slender, 6–7 cm. long, grooved ventrally; blade chartaceous, ovate-oblong, 12–20 cm. long, bipinnate; lobes of pinnae spinulose, marginal cells transparent; both surfaces of blade and stipe covered with globular glands; veins free, simple or once forking; sori borne dorsally on the veins; indusium reniform; sporangia biconvex; spores reniform, rugose.

TYPE LOCALITY: Kauai, at 1,600–2,000 m. elevation.

DISTRIBUTION: Hawaiian Islands.

ILLUSTRATION: PLATE 44.

SPECIMENS EXAMINED: Kauai, *E. Johnson* (type) B; Hawaiian Islands, *Hillebrand* C.

This very delicate fern is a miniature *Dryopteris glabra* (Brack.) Kuntze in form but is easily distinguished from this plant by its glandular exterior in addition to its small size.

DRYOPTERIS SQUAMIGERA (Hook. & Arn.) Kuntze, Rev. Gen. Pl. **2**: 813. 1891

Nephrodium squamigerum Hook. & Arn. Bot. Beech. 106. 1832.
Lastraea squamigera Brack. Fil. U. S. Expl. Exp. 198. 1854.
Aspidium squamigerum Mann, Proc. Am. Acad. **7**: 217. 1868.

TYPE LOCALITY: Kaala Mountains, Oahu.

DISTRIBUTION: At elevations of 600–1,200 m., Hawaiian Islands, Viti Islands, Society Islands; rare.

ILLUSTRATION: Hook. Sp. Fil. **4**: 270. 1862.

SPECIMENS EXAMINED: Oahu, *Wilkes Expedition* N; Kauai, *Heller 2841* C, N; Lanai, *Lichtenthaler* N; Hawaiian Islands, *Baldwin 70* C, N.

Dryopteris hawaiiensis (Hilleb.) comb. nov.

Aspidium hawaiiense Hilleb. Fl. Haw. Is. 575. 1888.
Dryopteris Filix-mas C. Chr. Ind. Fil. 265. 1905.

TYPE LOCALITY: Mauna Kea, Hawaii.

DISTRIBUTION: Hawaiian Islands.

SPECIMENS EXAMINED: Hawaii, Mauna Kea, *Hillebrand* (type) B; Hawaii, Hamakua, *Hillebrand* B; Maui, *Robinson 390* V; *395* V; Oahu, *Lichtenthaler* N; Hawaiian Islands, ex Herb. John Donnell Smith N.

DRYOPTERIS RUBIGINOSA (Brack.) Kuntze, Rev. Gen. Pl. **2**: 813. 1891

Lastraea rubiginosa Brack. Fil. U. S. Expl. Exp. 201. 1854.
Nephrodium rubiginosum Hook. Sp. Fil. **4**: 143. 1862.
Aspidium rubiginosum Mann, Proc. Am. Acad. **7**: 217. 1868.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: Hawaiian Islands.

SPECIMENS EXAMINED: Hawaii, *Hillebrand* B; *Robinson 285* V; *621* V; *Wilkes Expedition* (type) N; Molokai, *Hillebrand* B;

Lichtenthaler N; Oahu, *Hillebrand* B; *Robinson 136* V; *Safford 909;* Kauai, *Hillebrand* B.

Dryopteris fijiense (Hook.) C. Chr. is a closely related species but may be distinguished from *D. rubiginosa* (Brack.) Kuntze by its more open divisions, by the ciliated margin of its pinnules, and by its ciliated indusia, in contrast to the compact form and entire margins of the pinnules and indusia of *D. rubiginosa*. Compare Hook., A 2d Century of Ferns *pl. 67*. 1861; also Hook. Sp. Fil. **4**: 143. 1862.

DRYOPTERIS HONOLULENSIS (Hook.) C. Chr. Ind. Fil. 271. 1905

Polypodium honolulense Hook. Sp. Fil. **4**: 288. 1862.

Polypodium Hillebrandii Hook. Sp. Fil. **4**: 254. 1862. (Not **4**: 228. 1862.)

Phegopteris honolulense Mann, Proc. Am. Acad. **7**: 218. 1867.

Phegopteris Hillebrandii Hilleb. Fl. Haw. Is. 566. 1888.

TYPE LOCALITY: Oahu.

DISTRIBUTION: On ground at elevations of 700–1,300 m., Hawaiian Islands.

SPECIMENS EXAMINED: Kauai, *Robinson 383* V; Lanai, *Hillebrand* B, C; Molokai, *Hillebrand* B, C; Oahu, *Hillebrand* B, C; *Remy* B; *Robinson 170* V; Kauai, *Hillebrand* B; *Robinson 821*; Hawaiian Islands, *Baldwin 77* B, C; *Lydgate* B.

There is a strong superficial resemblance between *Dryopteris honolulensis* (Hook.) C. Chr. and *Dryopteris latifrons* Brack., but the small submarginal, naked sori distinguish the former.

DRYOPTERIS CRINALIS (Hook. & Arn.) C. Chr. Ind. Fil. 259. 1905

Polypodium crinale Hook. & Arn. Bot. Beech. 105. 1841.

Phegopteris crinalis Mann, Proc. Am. Acad. **7**: 218. 1867.

TYPE LOCALITY: Oahu.

DISTRIBUTION: Hawaiian Islands.

SPECIMENS EXAMINED: Hawaii, *Hillebrand* B, C; Molokai, *Hillebrand* B; Kauai, *Forbes 269* BM; *Johnson* B; *Heller 2587* C; *Robinson 412* V; Hawaiian Islands, *Baldwin 75* C; *Baldwin* B; *Baldwin* V.

Young specimens of *D. crinalis* are gray green in color, while mature specimens are rusty in appearance owing to the leathery texture and scaly under surface of the leaves.

DRYOPTERIS KERAUDRENIANA (Gaud.) C. Chr. Ind. Fil. 272. 1905

Polypodium Keraudrenianum Gaud. Voy. Freyc. Bot. 362. 1829.
Phegopteris Keraudreniana Mann, Proc. Am. Acad. **7**: 218. 1867.
Nephrodium Keraudrenianum (Gaud.) Diels in E. & P. Nat. Pfl. 1^4: 177. 1899.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: In forests, Hawaiian Islands.

ILLUSTRATION: Gaud. Voy. Freyc. Bot. *pl. 7*. 1829.

SPECIMENS EXAMINED: Hawaii, *Robinson 336* V; *Wilkes Expedition* C; Maui, *Hillebrand* B; Molokai, *Hillebrand* B; Kauai, *Forbes 96* BM; Hawaiian Islands, *Baldwin 78* C; *Baldwin* V; *Gaudichaud* (type) B; *Hillebrand* B, C.

Although *Dryopteris Keraudreniana* and *Dryopteris rubiformis* are very similar in habit, they may be easily distinguished by the stramineous midrib and broad lanceolate pinnae of the former in contrast with the reddish midrib and narrow linear pinnae of the latter. Both support their weight by the attachment of the tips of the leaves to other plants, in a vinelike coil. If the leaf curves so that the end finally reaches the soil, it does not take root.

Hillebrand's variety *tripinnata* (Hilleb. Fl. Haw. Is. 562. 1888) has toothed segments in its pinnules, but this difference is too slight to warrant its separation from the species.

Dryopteris rubiformis nom. nov.

Polypodium procerum Brack. Fil. U. S. Expl. Exp. 14. 1854. Not *Dryopteris procera* (Baker) Kuntze.
Phegopteris Keraudreniana var. *procera* Hilleb. Fl. Haw. Is. 562. 1888.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: In open places on the mountain sides, Hawaiian Islands.

ILLUSTRATION: Brack. Fil. U. S. Expl. Exp. *pl. 3*. 1854.

SPECIMENS EXAMINED: Maui, *Hillebrand* B; Kauai, *Robinson 423* V; *829* V; Hawaiian Islands, *Baldwin 94* C; *Wilkes Expedition* C.

The reddish stem and midrib of this fern, together with its tendency to curve and rest its weight upon other plants in a

thicket, suggest the appearance of blackberry vines by the roadside.

The type was collected upon the U. S. Exploring Expedition of 1854.

DRYOPTERIS ACUTIDENS C. Chr. Ind. Fil. 250. 1906

Phegopteris spinulosa Hilleb. Fl. Haw. Is. 566. 1888. Not *Dryopteris spinulosa* (Müll.) Kuntze.

Polypodium spinulosum Baker, Ann. Bot. **5**: 459. 1891.

TYPE LOCALITY: Southern slope of Haleakala, Maui.

DISTRIBUTION: Along banks of streams, at elevations of 400–1,400 m., Hawaiian Islands.

SPECIMENS EXAMINED: Hawaii, *Hillebrand* B, C; Oahu, *Robinson 177* V; Maui, *Hillebrand* B, C; *Robinson 384* V; *604* V; *614* V; Kauai, *Heller 2874* C; Hawaiian Islands, *Baldwin 76* C; *Hillebrand* B; *Lydgate* B.

There is a marked superficial resemblance between *D. acutidens* C. Chr. and the North American *D. dilatata* (Hoffm.) A. Gray, but there is no trace of an indusial covering for the sorus in the youngest specimens of *D. acutidens*.

DRYOPTERIS UNIDENTATA (Hook. & Arn.) C. Chr. Ind. Fil. 299. 1905

Polypodium unidentatum Hook. & Arn. Bot. Beech. 105. 1832.

Phegopteris unidentata J. Sm. Ferns Brit. & For. 170. 1866.

Nephrodium unidentatum Diels in E. & P. Nat. Pfl. 1^4: 174. 1899.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: In forests at 600–1,200 m. elevation, Hawaiian Islands.

SPECIMENS EXAMINED: Hawaii, *Hillebrand* B; Maui, *Hillebrand* B, C; Molokai, *Hillebrand* B, C; Oahu, *Robinson 194* V; Kauai, *Hillebrand* B, C; Hawaiian Islands, *Baldwin 79* B, C; *Gaudichaud* B; *Hillebrand* B; *Baldwin* V.

Hillebrand's variety *paleacea* of this fern is apparently a form that has arisen from ecological causes rather than a stable variation; thus the tall habit and light color are characteristic of the plants growing in the deep forest at higher elevations than that of the dark green plants with short caudex.

DRYOPTERIS SANDWICENSIS (Hook. & Arn.) C. Chr. Ind. Fil. 290. 1905

Polypodium sandwicense Hook. & Arn. Bot. Beech. 105. 1832.
Phegopteris sandwicensis Mann, Proc. Am. Acad. **7**: 218. 1867.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: In forests, Hawaiian Islands, Viti Islands, and Pitcairn Island.

SPECIMENS EXAMINED: Hawaii, *Hillebrand* B; Maui, *Hillebrand* B; Lanai, *Hillebrand* B; Molokai, *Hillebrand* B, C; Oahu, *Hillebrand* B, C; Kauai, *Heller 2838* C; *Hillebrand 66* B; Hawaiian Islands, *Baldwin 79a* B; *Hillebrand* B; *Knudsen 158* B; *159* B; *160* B; *Lydgate* B.

DRYOPTERIS PROPINQUA (R. Br.) Gilb. Bull. Torrey Club **23**: 454. 1896

Aspidium unitum Sw. Jour. Bot. Schrad. **1800**[2]: 32. 1801. Not *Dryopteris unita* (L.) Kuntze.
Nephrodium propinquum R. Br. Prod. Fl. N. Holl. 148. 1810.
Aspidium resiniferum Kaulf. Enum. 237. 1824.
Aspidium propinquum Sw. Adnot. 67. 1829.
Nephrodium resiniferum Hook. & Arn. Bot. Beech. 105. 1832.
Aspidium Ecklonii Kunze, Linnaea **10**: 546. 1836.
Nephrodium Ecklonii Presl, Epim. 49. 1849.

TYPE LOCALITY: Australia.

DISTRIBUTION: Very common in swamps in tropical countries.

ILLUSTRATION: Schkuhr, Krypt. Gew. *pl. 33b.* 1809.

SPECIMENS EXAMINED: Oahu, *Beechey* C; *Robinson 90* V; Maui, *E. Bailey* C; Kauai, *Forbes 37* BM; *Heller 2594* C; *Robinson 465* V; *467* V; *474* V; Hawaiian Islands, *Baldwin 66* B, C; *Gulick* B; *Hillebrand* B.

Dryopteris propinqua has caused much confusion because certain transitory characters, such as the hairs on the surface of the leaf and at the margin of the indusium, have been considered as specific.

This species is rarely in fruit though it grows abundantly in the roadside ditches from sea level to 1,500 m. elevation.

DRYOPTERIS PARASITICA (L.)K untze, Rev. Gen. Pl. **2**: 811. 1891

Polypodium parasiticum L. Sp. Pl. 1090. 1753.

Polypodium dentatum Forsk. Fl. Aeg.-arab. 185. 1775.
Polypodium nymphale Forst. Prod. 81. 1786.
Polypodium molle Jacq. Coll. Bot. **3**: 188. 1789. (Not Schreb. 1771 nor All. 1785.)
Aspidium molle Sw. Jour. Bot. Schrad. **1800**[2]: 34. 1801.
Aspidium parasiticum Sw. Jour. Bot. Schrad. **1800**[2]: 35. 1801.
Aspidium patens Sw. Jour. Bot. Schrad. **1801**[1]: 280. 1803.
Aspidium nymphale Schkuhr, Krypt. Gew. **1**: 36. *pl. 34*. 1806.
Nephrodium molle R. Br. Prod. Fl. N. Holl. 149. 1810.
Nephrodium parasiticum Desv. Mém. Soc. Linn. **6**: 258. 1827.
Nephrodium nymphale Desv. Mém. Soc. Linn. **6**: 258. 1827.
Polystichum molle Gaud. Voy. Freyc. Bot. 326. 1828.
Aspidium violascens Link, Hort. Berol. **2**: 115. 1833.
Nephrodium violascens Fée, Mém. Foug. **5**: 305. 1852.

TYPE LOCALITY: India.

DISTRIBUTION: In open places between 1,400–1,600 m. elevation. Tropics, subtropics, and New Zealand.

ILLUSTRATIONS: Rheede, Hist. Hort. Malab. **12**: 17. 1753; Schkuhr, Krypt. Gew. *pl. 34*. 1806.

SPECIMENS EXAMINED: Hawaii, *Robinson 223* V; Oahu, *Heller 2011* C; *Robinson 170* V; *188* V; *192* V; Kauai, *Robinson 800* V; *805* V; *811* V.

There is a marked superficial resemblance between *Dryopteris parasitica* and *D. globulifera*, but the former is distinguished by its hairy epidermis and indusia in addition to the short lobes of its pinnae, while the latter has glands upon its epidermis and indusia, and its pinnae are deeply cut.

DRYOPTERIS CYATHEOIDES (Kaulf.) Kuntze, Rev. Gen. Pl. **2**: 812. 1891

Aspidium cyatheoides Kaulf. Enum. Fil. 234. 1824.
Polystichum Dubrueilianum Gaud. Freyc. Voy. Bot. 333. 1828.
Nephrodium Dubrueilianum Hook. & Arn. Bot. Beech. 105. 1832.
Nephrodium cyatheoides Presl, Tent. Pterid. 81. 1836.
Aspidium cyatheoides Mett. Aspid. 110. 1858.

TYPE LOCALITY: Oahu.

DISTRIBUTION: On ground in the lower forests and along rivers, Hawaiian Islands, New Guinea, Sumatra.

ILLUSTRATIONS: Gaud. Voy. Freyc. Bot. *pl. 9.* 1828; Presl, Tent. Pterid. *pl. 2. f. 5.* 1836; Hook. Sp. Fil. **4**: *pl. 241.* 1862.

SPECIMENS EXAMINED: Hawaii, *Robinson 232* V; *Wilkes Expedition* C; Molokai, *Hillebrand* B; Oahu, *Anderson* B; *Bennett 11* B; *Bennett* B; *Chamisso* B; *Heller 1991* C, N; *Lichtenthaler* N; *Macrae* B; *Meyen* B; *Remy 13* C; *Robinson 21* V; *Wilkes Expedition* N; Kauai, *Heller 2857* C; *Hillebrand 85* B; *87* B; *Mann & Brigham 152* N; *Wilkes Expedition* N; Hawaiian Islands, *Baldwin* B, C; *63* C; *Beechey* C; *Wilkes Expedition* C; *Gaudichaud* B; *Lindley* C; *Miss Sessions* C; *Wilkes Expedition* B; ex herb. Kew Gardens 2 specimens C.

The tips of young leaves of this fern are eaten by the Hawaiian natives as a salad.

There is an interesting superficial resemblance between *Dryopteris cyatheoides* and *D. stegnogrammoides.*

DRYOPTERIS STEGNOGRAMMOIDES (Baker) C. Chr. Ind. Fil. 294. 1905

Polypodium polycarpon Hook. & Arn. Bot. Beech. 104. 1832. Not Swartz.

Stegnogramma sandwicense Brack. Fil. U. S. Expl. Exp. 26. *pl. 4.* 1854. Not *Dryopteris sandwicensis* C. Chr.

Polypodium sandwicense Hook. Sp. Fil. **5**: 5. 1864. (Not **4**: 267. 1862.)

Polypodium stegnogrammoides Baker, Syn. Fil. 317. 1867.

Phegopteris microdendron D. C. Eaton in Mann, Proc. Am. Acad. **7**: 218. 1867.

Nephrodium polycarpon Diels in E. & P. Nat. Pfl. 1^4: 179. 1899.

TYPE LOCALITY: Hawaiian Islands.

DISTRIBUTION: Hawaiian Islands.

ILLUSTRATION: Brack. Fil. U. S. Expl. Exp. *pl. 4.* 1854.

SPECIMENS EXAMINED: Hawaii, *Robinson 617* V; Molokai, *Hillebrand* B; *Lindley* C; *Macrae* B; Kauai, *Forbes 239* BM; Hawaiian Islands, *Baldwin* B; *Gaudichaud* B.

Hillebrand (Fil. Haw. Is. 560. 1888) describes the caudex of *Dryopteris stegnogrammoides* as erect, but the specimens collected by the writer had prostrate rootstocks. His variety *depauperata* probably owes its decreased size and pubescence to its exposed

situation upon the rocks, a theory which seems the more tenable from his statement that a corresponding form of *Dryopteris cyatheoides* is associated with this variety of *D. stegnogrammoides* in such localities.

DRYOPTERIS TRUNCATA (Poir.) Kuntze, Rev. Gen. Pl. **2**: 814. 1891

Polystichum truncatum Gaud. Voy. Freyc. Bot. 332. *pl. 10.* 1828.
Nephrodium truncatum Presl, Tent. Pterid. 81. 1836.
Nephrodium Hudsonianum Brack. U. S. Expl. Exp. 189. *pl. 25.* 1854.
Aspidium Hudsonianum Mann, Proc. Am. Acad. **7**: 217. 1867.

TYPE LOCALITY: Brazil.

DISTRIBUTION: Malaysia, Polynesia, Ceylon, Northern India, Brazil.

ILLUSTRATIONS: Gaud. Voy. Freyc. Bot. *pl. 10.* 1828; Brack. Fil. U. S. Expl. Exp. *pl. 25.* 1854.

SPECIMENS EXAMINED: Hawaii, *Wilkes Expedition* N; Oahu, *Heller 2334* C, N; *Mann & Brigham* N; *Robinson 152* V; *192* V; *522* V; *523* V; *Safford 869* N; *870* N; Maui, *Bailey* C; Kauai, *Heller 2843* C, N; *Hillebrand* B; Hawaiian Islands, *Baldwin 64* B; C; *65* B; (*Baldwin*) V; *Gaudichaud* B.

Poiret gives the habitat of *Dryopteris truncata* as Brazil. Baker (Syn. Fil. 295. 1874) gives a range of distribution through the subtropics, which Christensen follows. The representation of this genus in the herbarium of the New York Botanical Garden does not indicate that this is so cosmopolitan a species.

New West Indian Lejeuneae—II

ALEXANDER W. EVANS

(WITH PLATE 45)

In the first paper of this series, published in the BULLETIN for August 1908, six species of *Lejeuneae* from various islands of the West Indies were described and figured. One of these species, *Leiolejeunea grandiflora*, was proposed as the type of a new genus; the others belonged to genera that had been more or less fully discussed by the writer in a series of papers on the Hepaticae of Puerto Rico.* In the present paper three additional species are considered, all from the island of Jamaica. The genera to which they belong, *Diplasiolejeunea*, *Leptocolea*, and *Rectolejeunea*, are likewise among those discussed in connection with the Puerto Rico Hepaticae. The type specimens of the new species are preserved in the herbarium of the writer at New Haven, Connecticut.

Diplasiolejeunea Johnsonii sp. nov.

Pale green or yellowish, growing in depressed mats: stems 0.12 mm. in diameter, abundantly but irregularly branched, the branches obliquely spreading, similar to the stem but usually with smaller leaves: leaves of stems and leading branches closely imbricated, the lobe obliquely to widely spreading, distinctly convex, the margin usually revolute in apical and postical portions, orbicular-ovate, 1.1–1.5 mm. long, 1–1.2 mm. wide, antical margin rounded at the base and arching across the axis, outwardly curved to the broad and rounded apex, postical margin also curved; lobule inflated in carinal portion, otherwise more or less appressed to the lobe, obovate, 0.75 mm. long, 0.4 mm. wide, keel arched, forming a continuous line with the revolute portion of the lobe, free margin scarcely involute except at the very base, apical tooth obliquely spreading, triangular, acute or obtuse, tipped by a single conical or rounded cell, rarely by two superimposed cells, mostly four or five cells long and three to five cells wide at the base, proximal tooth obtuse and much shorter, usually consisting of a single projecting cell reinforced by a second cell coalescent with

* Bull. Torrey Club **29**: 496. 1902. Et seq.

the inner surface of the lobule, hyaline papilla usually distal; cells of lobe averaging about 18μ at the margin and 30 × 25μ in the median and basal portions, walls more or less thickened, with small but distinct triangular trigones and occasional intermediate thickenings: underleaves contiguous or subimbricated, broadly cuneate, about 0.3 mm. long (0.15 mm. to the bottom of the sinus) and 0.45 mm. wide, bifid about one half with broad and rounded obliquely spreading divisions and an acute sinus: inflorescence autoicous: ♀ inflorescence borne on a leading branch or on a more or less abbreviated branch, the innovation usually simple and sterile but sometimes bearing a second female flower; bracts obliquely spreading, sharply complicate, the keel with a very narrow wing, bifid about one fourth, the lobe narrowly oblong-obovate, 0.75 × 0.18 mm., rounded at the apex, lobule a little shorter and narrower, 0.68 × 0.15 mm., rounded at the apex; bracteole ovate, 0.68 mm. long, 0.3 mm. wide, bifid about one eighth with erect rounded to obtuse divisions and a broad obtuse sinus; perianth oblong-obovate, 1.1 mm. long, 0.6 mm. wide, truncate at the apex and with a very short beak, more or less compressed and sharply five-keeled: ♂ inflorescence occupying a short branch, not proliferating; bracts mostly in from four to six pairs, imbricated, inflated, subequally bifid with a strongly arched keel and rounded divisions; bracteoles oblong-quadrate, bifid about one third with rounded divisions: mature sporophyte not seen. (PLATE 45, FIGURES 1–6.)

On bark of trees. Jamaica: Cinchona, *D. S. Johnson* (*14*), April 1903; *Evans* (*250* in part), July 1903. No. 14 may be designated the type.

It can not be stated with certainty whether *D. Johnsonii* is gemmiparous or not. A few young gemmae were observed on the lower surface of a single lobe, but they may not have developed in this situation. The species is characterized by the strongly convex lobes with the apical and postical margins tending to be revolute, by the peculiar teeth of the lobules, by the broad and rounded divisions of the underleaves, by the autoicous inflorescence, and by the rounded divisions of the perichaetial bracts and bracteoles. The revolute portion of the lobe usually involves the junction of the lobe with the lobule, one effect being that the end of the sinus is displaced to the lower surface of the lobe. The apical tooth of the lobule is in the form of a triangle about as broad as high, and the apex is sometimes slightly curved to one side. The proximal tooth looks at first as if it were composed of a

single projecting cell. Closer inspection, however, shows that the conditions are more complicated, and that a second cell on the inner surface of the lobule is coalescent with this projecting cell and with the two cells at its base. In other words the lobule is two cells thick where the proximal tooth is situated, a peculiarity which has not yet been recorded in any other member of the genus. The divisions of the underleaves often attain a width of from ten to twelve cells.

Five species of *Diplasiolejeunea* are now definitely known from Jamaica, the others being *D. pellucida* (Meissn.) Schiffn., *D. brachyclada* Evans, *D. unidentata* (Lehm. & Lindenb.) Schiffn., and *D. Rudolphiana* Steph. Since these species occur also in Puerto Rico, they have been described and figured by the writer.* Two of them, *D. brachyclada* and *D. Rudolphiana*, agree with *D. Johnsonii* in being autoicous, while the two others are definitely dioicous. In *D. Rudolphiana* and *D. unidentata*, which seem to be closely related to the new species, the lobes of the leaves, although convex, are not revolute in the vicinity of the keel, so that the end of the sinus is not displaced. The underleaves in these two species have much in common with those of *D. Johnsonii*, and their divisions are fully as broad; they show, however, a distinct narrowing toward the apex. Their lobular teeth show much more striking differences. In *D. Rudolphiana* the apical tooth is remarkably long and slender and is usually subparallel with the axis instead of being broadly triangular and spreading obliquely. In *D. unidentata* the tooth is oblique and about as long as in *D. Johnsonii*, but it is more slender and is usually tipped with two superimposed cells, a condition rarely found in the new species. The most important differences in the proximal teeth have already been mentioned. In the material collected by the writer *D brachyclada* grows mixed with *D. Johnsonii*, but the two species are amply distinct. The underleaves of *D. brachyclada* have narrow and sharply pointed divisions, the apical teeth of the lobules are often truncate or t-shaped and are usually only one cell broad, the perichaetial bracts and bracteoles are more deeply bifid, and the divisions of the latter are acute. Similar differences

* Bull. Torrey Club **39**: 209–225. *pl. 16, 17.* 1912.

will separate *D. Johnsonii* from *D. pellucida*, which latter, moreover, almost invariably grows on leaves.

Leptocolea appressa sp. nov.

Pale green, growing in closely appressed mats: stems 0.05 mm. in diameter, sparingly and irregularly pinnate, the branches obliquely spreading, similar to the stem but with somewhat smaller leaves: stem leaves imbricated, the lobe widely spreading, falcate, ovate-oblong, 0.5–0.6 mm. long, 0.3–0.4 mm. wide, broad and rounded at the apex, antical margin arching considerably beyond the axis, strongly outwardly curved from base to apex, postical margin straight or slightly curved, forming a rounded indentation with the keel, margin very minutely crenulate from projecting verruculae; lobule inflated throughout, ovate, 0.14 mm. long, 0.08 mm. wide, keel arched, apical tooth consisting of two cells in a row, proximal tooth shorter, consisting of a sharp or blunt projecting cell, teeth separated by a very narrow sinus containing a marginal hyaline papilla; stylus (at base of lobule) consisting of a papilla; cells of lobe averaging 5μ at the margin, 9 $\times$ 7μ in the middle, and 20 $\times$ 7μ at the base, wall more or less uniformly thickened but without distinct trigones except in median and basal regions, each cell bearing a median verrucula on the free outer wall except in the basal portion of the leaf; ocelli usually four, arranged in a short median row and averaging about 35 $\times$ 23μ: inflorescence autoicous (but many plants apparently unisexual): ♀ inflorescence borne on a more or less elongated branch, innovating on one side, the innovation usually short and sterile; bracts obliquely spreading, complicate, keel sharp but without a wing, lobe oblong-obovate, 0.45 mm. long, 0.25 mm. wide, rounded at the apex, margin as in the leaves, ocelli several, forming an elongated patch several cells wide, lobule obovate, 0.25 mm. long, 0.2 mm. wide, rounded and irregularly dentate at the apex; perianth about one fourth exserted, obovate, 0.45 mm. long, 0.4 mm. wide, truncate at the apex with a distinct beak, five-keeled in the upper part, the lateral keels sharp, antical keel low and short, postical keels obtuse but extending almost to the base, lateral keels minutely and irregularly denticulate from projecting cells, surface otherwise smooth or nearly so: ♂ inflorescence (so far as observed) borne on a leading branch; bracts in one to three pairs, monandrous, similar to the leaves but smaller and more obliquely spreading or even suberect: mature sporophyte not seen. (PLATE 45, FIGURES 7–16.)

On bark of trees. Jamaica: John Crow Peak, *Evans* (*104*),

July 1903; Clyde Valley, *Evans* (*270*), July 1903. No. 104 may be considered the type.

Although *L. appressa* is fairly large it is not conspicuous because both stems and leaves are firmly appressed to the bark. The ocelli form a striking feature of the species and are almost always arranged in a row of four, extending from the base of the lobe outward and thus simulating a short nerve (FIGURE 8). The contrast in size between the ocelli and the adjacent leaf cells is usually marked but sometimes, especially on the carinal side of the row, one or two series of cells are distinctly elongated and form a sort of transition between the ocelli and the ordinary cells. Occasionally similar elongated cells are to be observed in small number near the outer extremity of the row. The peculiar contents of the ocelli, however, will serve to distinguish them in case of doubt.

The new species produces gemmae in greater or less abundance, and these agree in method of development and in general structure with those found in other members of the genus.* Each consists at maturity of a flat broadly orbicular disk, about 0.07 mm. long and 0.09 mm. wide (FIGURE 16). The margin is very vaguely crenulate from projecting cells, there are three organs of attachment, and each half of the gemma shows twelve cells, their relative position indicating that the apical quadrants in the young gemma cut off four segments apiece. The gemmae bear a marked resemblance to those of *Leptocolea scabriflora* (Gottsche) Evans, a widely distributed species in the American tropics.

A close relative of *L. appressa* is **Leptocolea floccosa** (Lehm. & Lindenb.) comb. nov.,† a species originally described from the Philippines but since reported from both Java and Japan. In this species, which grows on leaves, the plants are closely appressed, just as in *L. appressa*, the ocelli (usually four in number) form a short false nerve, and the outer surfaces of the leaves are minutely roughened by rounded verruculae borne singly on the cells. The East Indian plant, however, is somewhat smaller, the lobes measur-

* For a discussion of the genus *Leptocolea* see Evans, Bull. Torrey Club **38**: 251–286. *pl. 11, 12.* 1911.

† = *Jungermannia floccosa* Lehm. & Lindenb. in Lehmann, Pug. Plant. **5**: 26. 1832. *Lejeunea floccosa* Lehm. & Lindenb. in G. L. & N. Syn. Hep. 324. 1845. *Lejeunea* (*Colo-Lejeunea*) *floccosa* Steph. Hedwigia **29**: 18. 1890. *Cololejeunea floccosa* Schiffn. Conspect. Hepat. Archip. Indici 243. 1898.

ing about 0.35 × 0.25 mm. or even less, the lobes are less falcate and spread more obliquely, the leaf cells are a little larger, averaging about 12 × 8μ in the middle of the lobe, the margin is entire, and the lobes are bordered by a smooth band from three to five cells wide except near the end of the keel, where it is narrower. According to Schiffner the lobule in *L. floccosa* is unidentate, but the specimens from Japan, which agree in all other respects with Schiffner's description and figures,* show bidentate lobules as in most members of the genus. The proximal tooth is remarkable in being the longer of the two, measuring from two to four cells in length and two or three cells in width at the base. It is sharply acute or even acuminate and is either straight, when it continues the free margin, or else it is more or less strongly curved toward the end of the keel. An exceedingly short indentation separates the proximal from the apical tooth. The latter consists normally of two cells, as in *L. appressa*, but is sometimes reduced to a single cell. Instead of spreading widely from the margin it extends toward the proximal tooth, thus tending to fill up the indentation between them and making it difficult to demonstrate. The hyaline papilla could not be clearly made out in the fragmentary material examined by the writer.

Two other species which are apparently close to *L. appressa* are *Lejeunea (Colo-Lejeunea) platyneura* Spruce,† of Brazil, and *Cololejeunea peraffinis* Schiffn.,‡ of Java. Both are known to the writer by description only but should probably be referred to the genus *Leptocolea*. They are distinguished by false nerves composed of ocelli, but these are arranged in two or more rows instead of in a single row. *Lejeunea platyneura* grows on leaves, its leaf cells are considerably larger than in *L. appressa*, measuring in the middle of the lobe 25–33μ (according to Spruce), and there are further differences in the bracts. In *C. affinis* the median leaf cells measure about 14 × 8μ (according to Schiffner), and the lobular teeth are more complex than in *L. appressa*.

* Nova Acta Acad. Caes. Leop.-Carol. **60**: 242. *pl. 9. f. 11–13.* 1893.

† Hep. Amaz. et And. 299. 1884.

‡ Nova Acta Acad. Caes. Leop.-Carol. **60**: 242. *pl. 9. f. 8–10.* 1893.

Rectolejeunea Maxonii sp. nov.

Pale green, becoming whitish or yellowish with age, growing in depressed mats: stems 0.05 mm. in diameter, copiously and irregularly branched, the branches widely spreading, usually similar to the stem but occasionally microphyllous: leaves loosely imbricated, the lobe plane, widely spreading, slightly falcate, broadly ovate, 0.5 mm. long, 0.4 mm. wide, antical margin more or less rounded at the base, then strongly outwardly curved to the broad and rounded apex, postical margin slightly curved or straight, forming a continuous line with the keel or slightly indented at the junction, margin slightly and irregularly crenulate from projecting cells; lobule usually well developed, inflated, broadly ovate, 0.1 mm. long, 0.09 mm. wide, keel more or less arched, free margin involute to the apex, apical tooth short and straight, hyaline papilla in a shallow indentation, sinus slightly lunulate; cells of lobe plane or more or less convex, averaging about 12μ at the margin, 22μ in the middle, and 27 $\times$ 22μ at the base, apparently uniformly thickened but showing upon careful focusing minute trigones and rare intermediate thickenings; ocelli none: underleaves distant, orbicular, about 0.17 mm. long, bifid about one half with erect, usually obtuse or rounded divisions and an obtuse to acute sinus, cuneate at the base, margin entire or vaguely and irregularly crenulate from projecting cells: inflorescence dioicous: ♀ inflorescence sometimes borne on a leading branch, sometimes on a more or less abbreviated branch, innovating on one side, the innovation sometimes simple and sterile but often soon again floriferous; bracts obliquely spreading, complicate, the keel sharp but not winged, lobe plane or nearly so, oblong-ovate to oblong-obovate, 0.5–0.6 mm. long, 0.35 mm. wide, rounded at the apex or very obtusely pointed, lobule ovate to oblong, 0.3 mm. long, 0.15 mm. wide, obtuse to rounded at the apex, margin of bracts as in the leaves; bracteole free from the bracts, ovate to obovate, 0.45 mm. long, 0.3 mm. wide, bifid about one third with rounded to subacute divisions and a narrow acute sinus; perianth about half exserted, obovate, 0.75 mm. long, 0.55 mm. wide, slightly emarginate at the apex with a short but distinct beak, the upper angles rounded, cuneate at the base, compressed, antical keel low and short, postical keel long, two-angled, surface smooth or (especially along the keels) slightly and irregularly roughened from projecting cells: ♂ inflorescence at first terminal on a more or less elongated branch but soon becoming intercalary through apical proliferation; bracts mostly in from two to six pairs, slightly imbricated, strongly inflated with an arched keel, shortly bifid with rounded divisions, the lobule

a little shorter than the lobe; bracteoles similar to the underleaves but smaller, restricted to the base of the inflorescence: capsule about 0.3 mm. in diameter; spores greenish, minutely verruculose, irregular in form, about 12μ in short diameter; elaters about 9μ in diameter, with a single spiral. (PLATE 45, FIGURES 17–27.)

On bark of trees. Jamaica: Cinchona, *L. M. Underwood* (*495*), February 1903; *W. R. Maxon* (*1361*), April 1903; *Evans* (*143* in part), July 1903. No. 1361 may be regarded as the type.

The microphyllous branches mentioned in the description are not abundant in the material examined, and little can be said in regard to their significance. In typical cases a branch of this character (FIGURE 18) exhibits the peculiarities associated with the genus *Microlejeunea*. The lobes of the leaves are ovate and suberect and measure only 0.18 × 0.11 mm., while the lobules are relatively large and measure about 0.13 × 0.1 mm. Such leaves are not very different from the rudimentary leaves found at the base of an ordinary branch, and it is possible that a microphyllous branch is simply one in which juvenile characters persist. Although similar branches have not yet been observed in other members of the genus, their occurrence would not be surprising.

A short time ago the writer proposed a new species of *Rectolejeunea* from the Bahama Islands, under the name *R. Brittoniae*,* and pointed out its close relationship to the widely distributed *R. phyllobola* (Nees & Mont.) Evans.† The new plant from Jamaica belongs in the same group of species. In its dicious inflorescence it agrees with *R. Brittoniae* and differs from *R. phyllobola;* in the restriction of its perigonial bracteoles to the base of the spike it agrees with *R. phyllobola* and differs from *R. Brittoniae*. Vegetative reproduction is apparently of rare occurrence in *R. Maxonii*. When it takes place it is by means of caducous leaves, just as in the other known members of the genus, but these leaves are not borne on specialized shoots. In this respect, as well as in most of the characters drawn from the leaves, leaf cells, and perianths, it agrees further with *R. Brittoniae* and *R. phyllobola*. The underleaves, however, afford a few additional differences.

* Bull. Torrey Club **38**: 209. *pl. 9. f. 1–12.* 1911.

† For a discussion of the genus *Rectolejeunea* see Evans, Bull. Torrey Club **33**: 1–16. *pl. 1, 2.* 1906.

They are somewhat smaller than those of *R. Brittoniae* but resemble them more closely in other respects than they do those of *R. phyllobola*. Their divisions are broad and triangular and are usually tipped with a single cell, making them obtuse (FIGURE 22), in rarer cases they are distinctly rounded at the apex (FIGURE 23), while in still rarer cases they are acute and tipped with two superimposed cells (FIGURE 24). This last condition, it will be remembered, is the usual one in *R. phyllobola*.

YALE UNIVERSITY.

Explanation of plate 45

The figures were drawn by the writer, and most of them were prepared for publication by Mr. Stanley C. Ball.

Diplasiolejeunea Johnsonii Evans. 1. End of a vigorous shoot, postical view, ×25. 2. Apical tooth of a lobule, ×200. 3. Proximal tooth of the same lobule, ×200. 4. Apex of an underleaf division, ×200. 5, 6. Bract and bracteole from a single involucre, ×35. The figures were all drawn from the type specimen.

Leptocolea appressa Evans. 7. Stem bearing a female branch with a perianth, postical view, ×35. 8. A leaf, antical view, ×35. 9. Cells from middle of lobe, ×265. 10. Cells from margin of lobe, ×265. 11. End of a row of ocelli with neighboring cells, ×265. 12. Apex of lobule, ×265. 13, 14. Bracts from a single involucre, ×45. 15. Transverse section of perianth in upper third, ×45. 16. Gemma, ×265. The figures were all drawn from the type specimen.

Rectolejeunea Maxonii Evans. 17. Part of a plant with two female inflorescences and a perianth, postical view, ×35. 18. Part of a microphyllous branch, postical view, ×35. 19. Cells from middle of lobe, ×265. 20. Cells from margin of lobe, ×200. 22. Apex of an underleaf division, typical structure, ×200. 23, 24. Apices of underleaf divisions, deviations from the typical structure, ×200. 25, 26. Bract and bracteole from a single involucre, ×35. 27. Transverse section of a perianth near apex, ×35. The figures were all drawn from the type specimen.

INDEX TO AMERICAN BOTANICAL LITERATURE

(1912)

The aim of this Index is to include all current botanical literature written by Americans, published in America, or based upon American material; the word America being used in the broadest sense.

Reviews, and papers that relate exclusively to forestry, agriculture, horticulture, manufactured products of vegetable origin, or laboratory methods are not included, and no attempt is made to index the literature of bacteriology. An occasional exception is made in favor of some paper appearing in an American periodical which is devoted wholly to botany. Reprints are not mentioned unless they differ from the original in some important particular. If users of the Index will call the attention of the editor to errors or omissions, their kindness will be appreciated.

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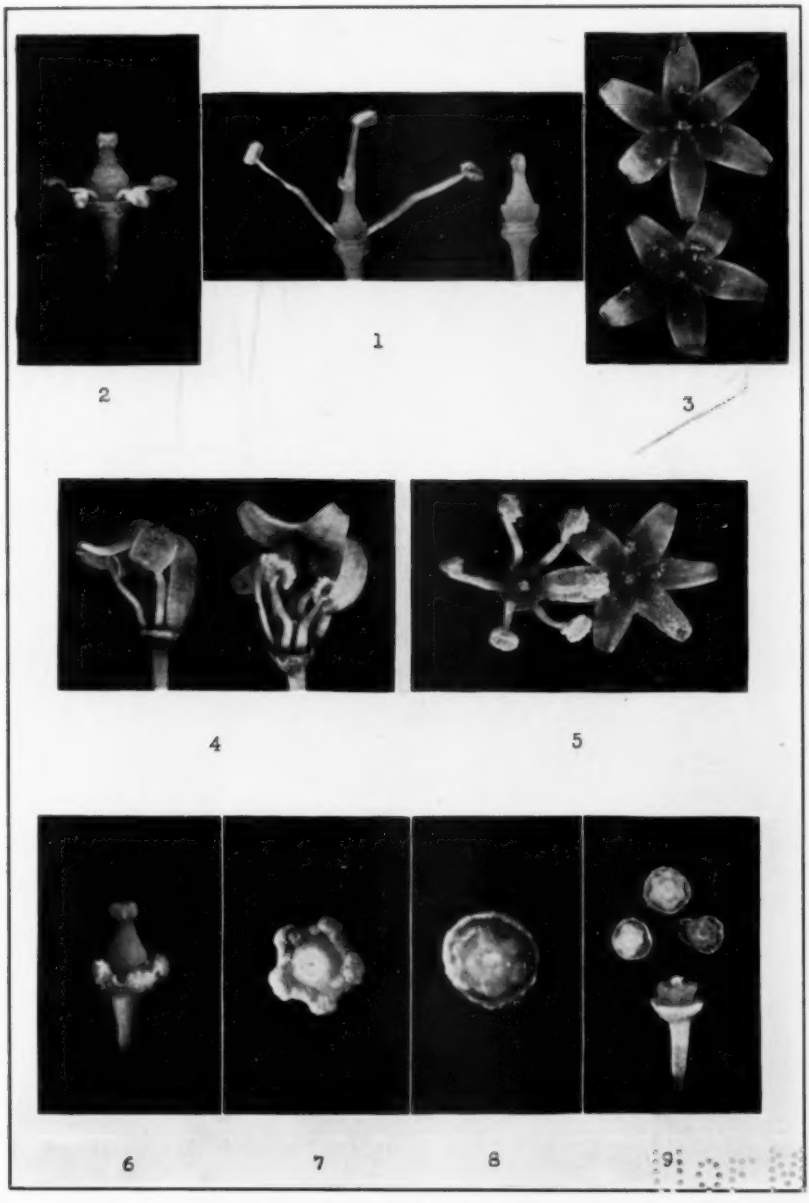
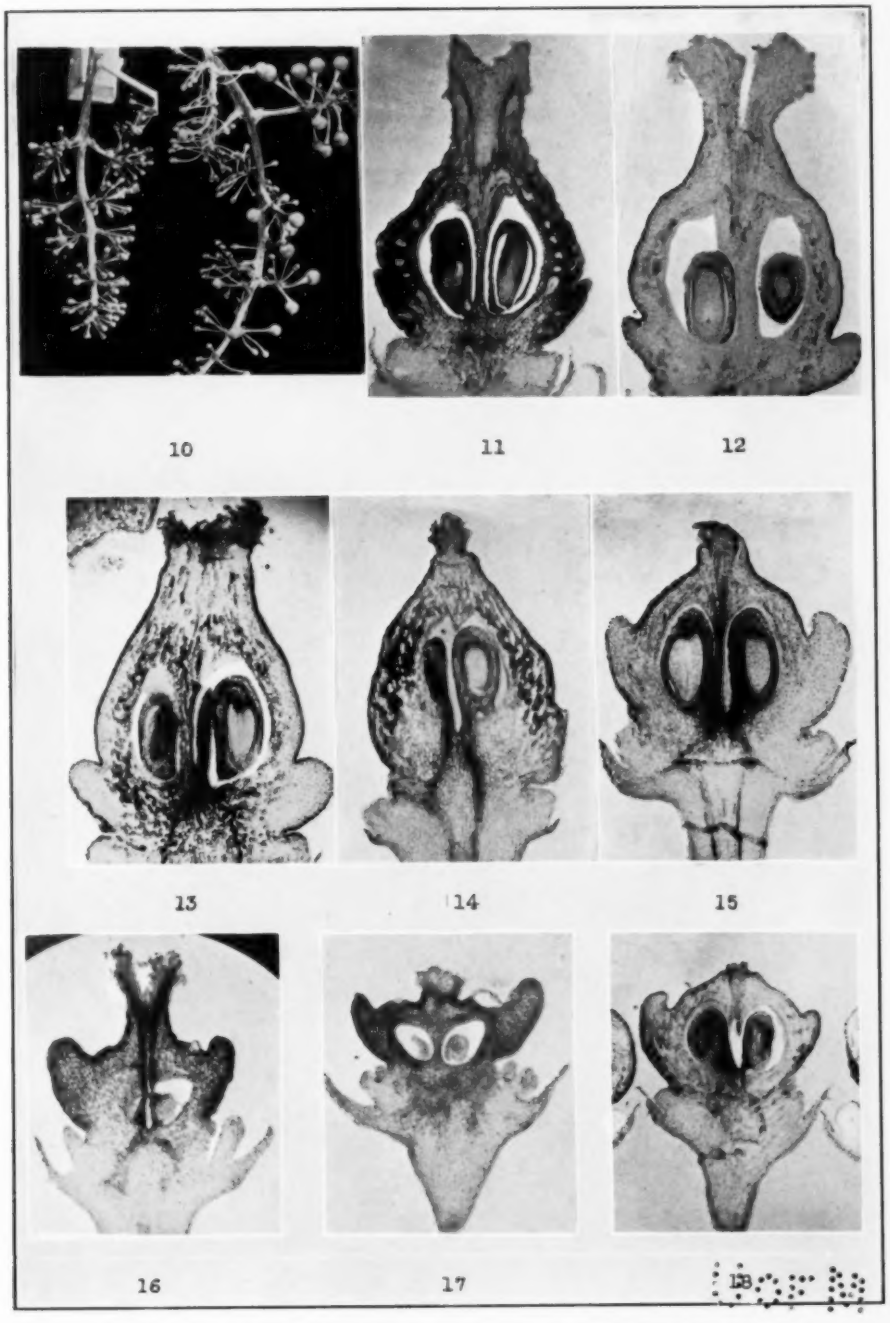


DORSEY: VARIATION IN FLORAL STRUCTURES OF VITIS



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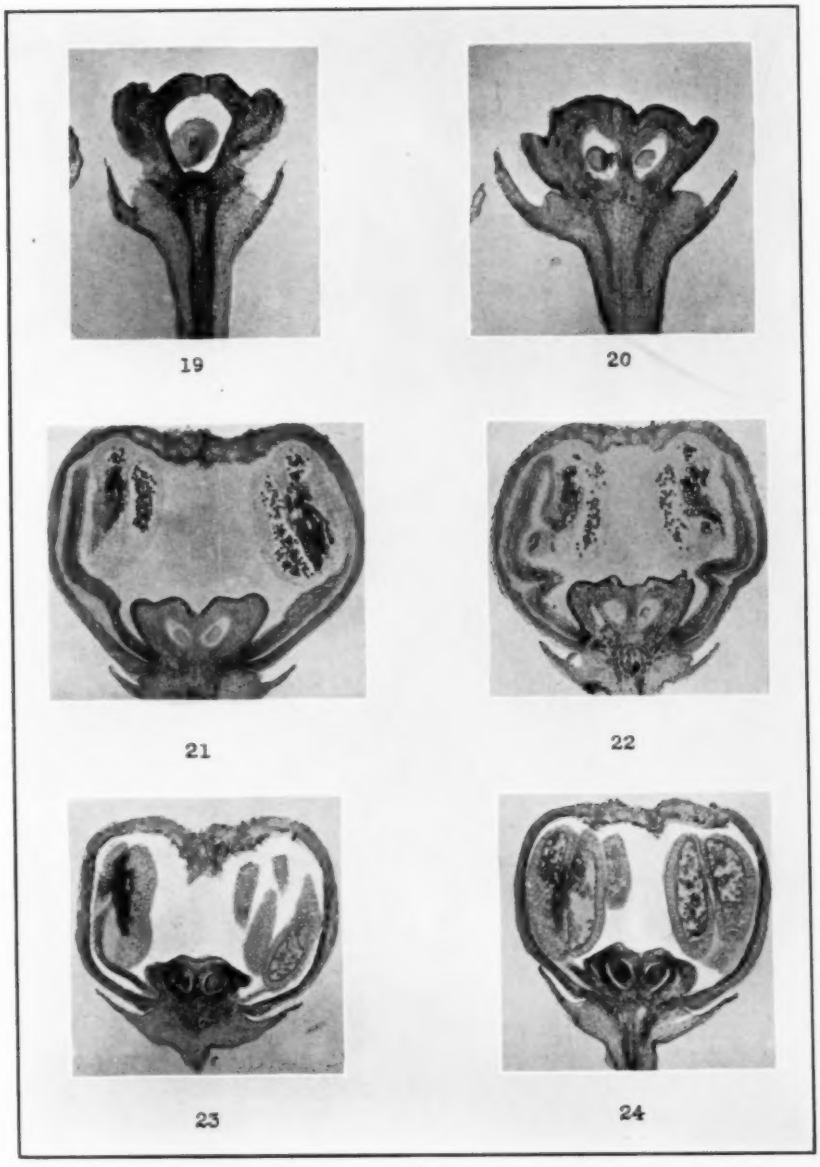

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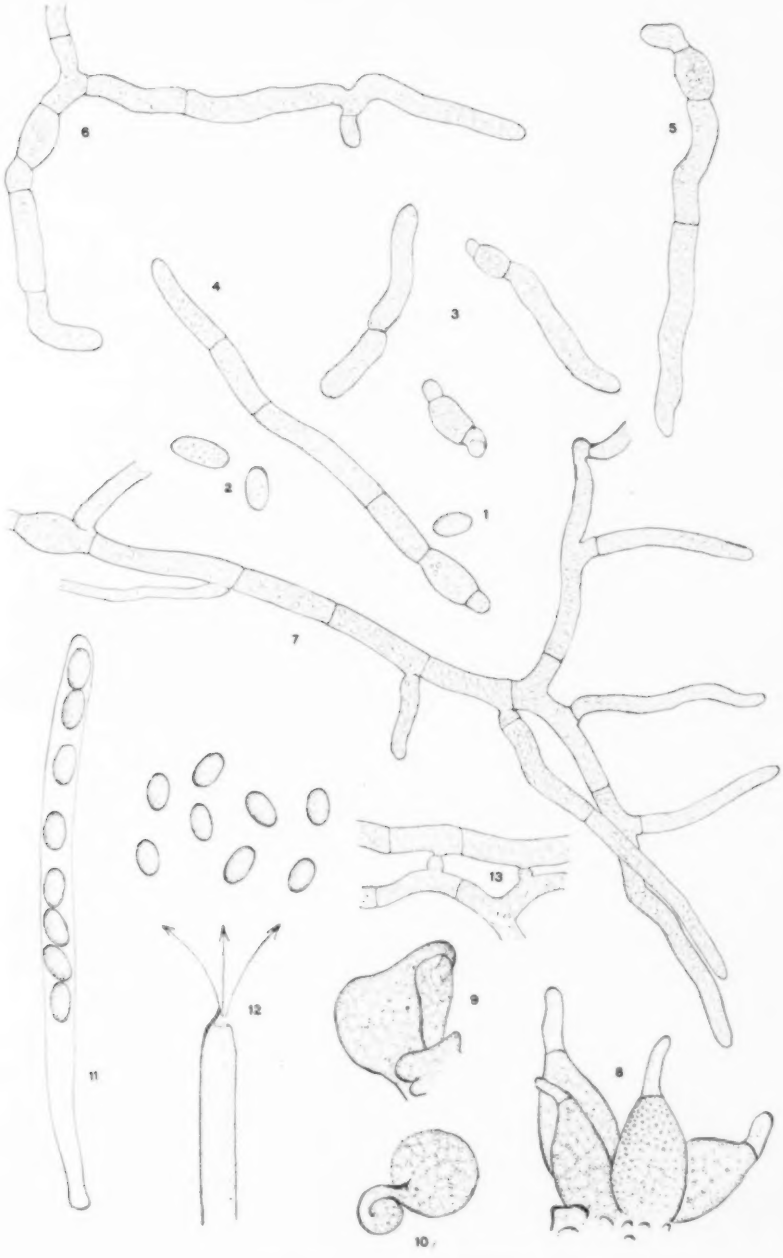
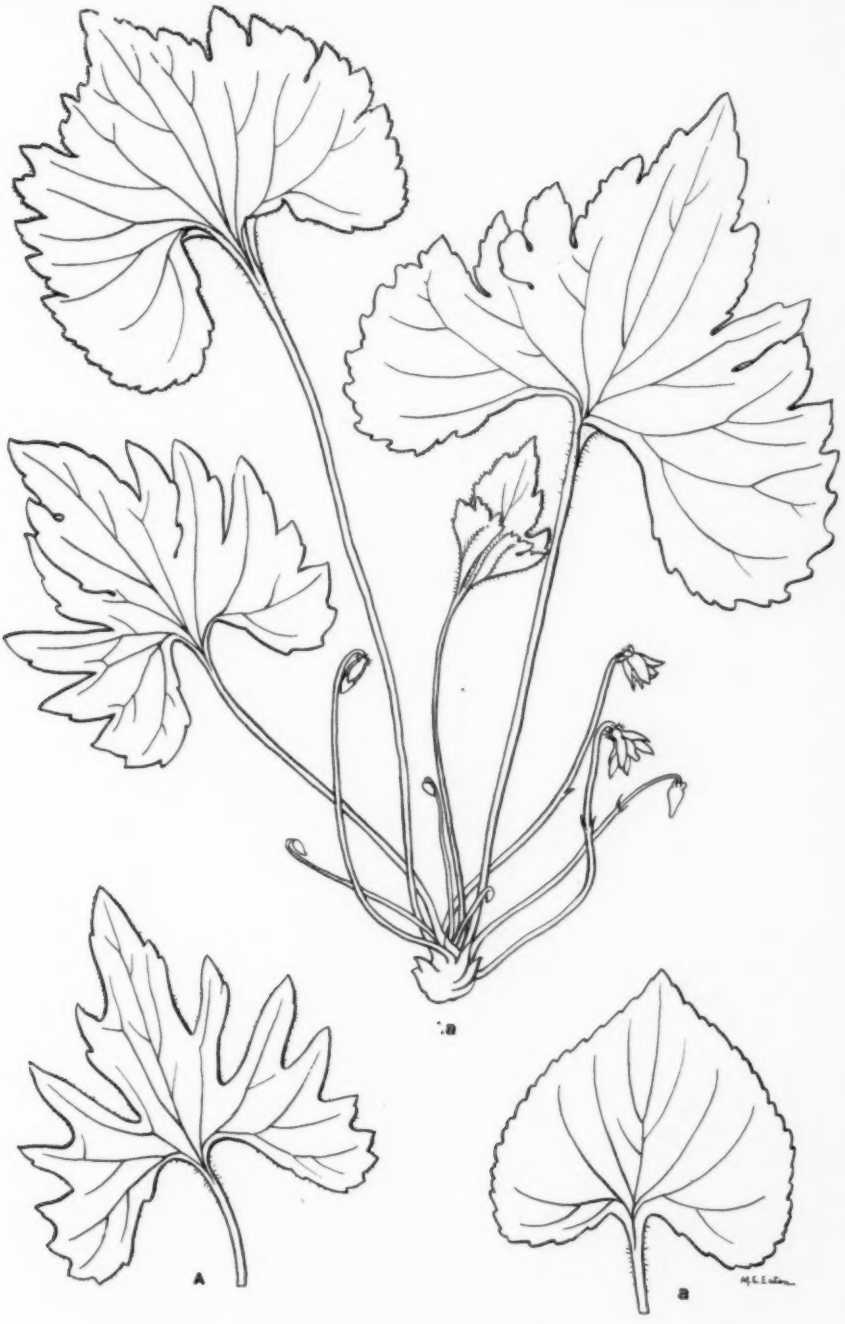
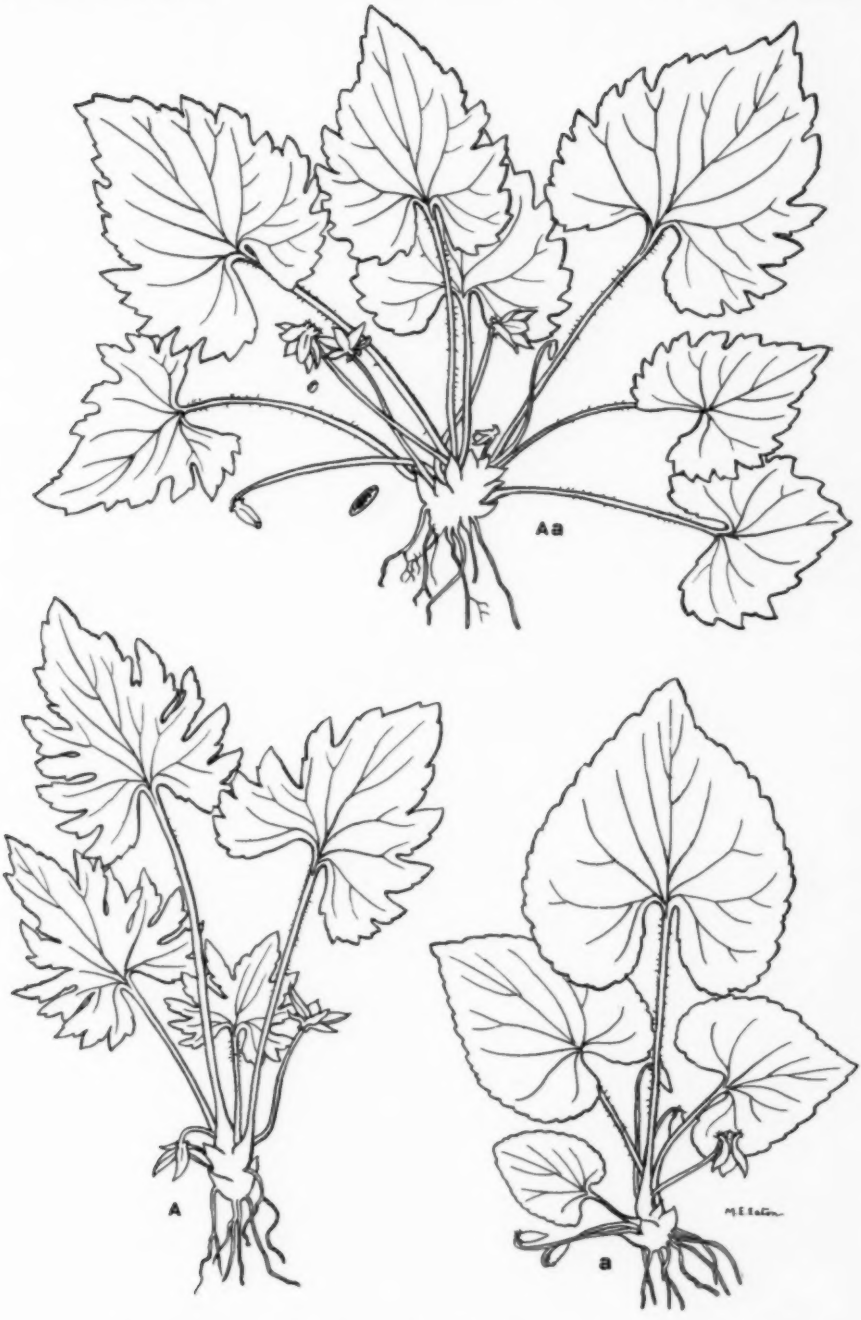


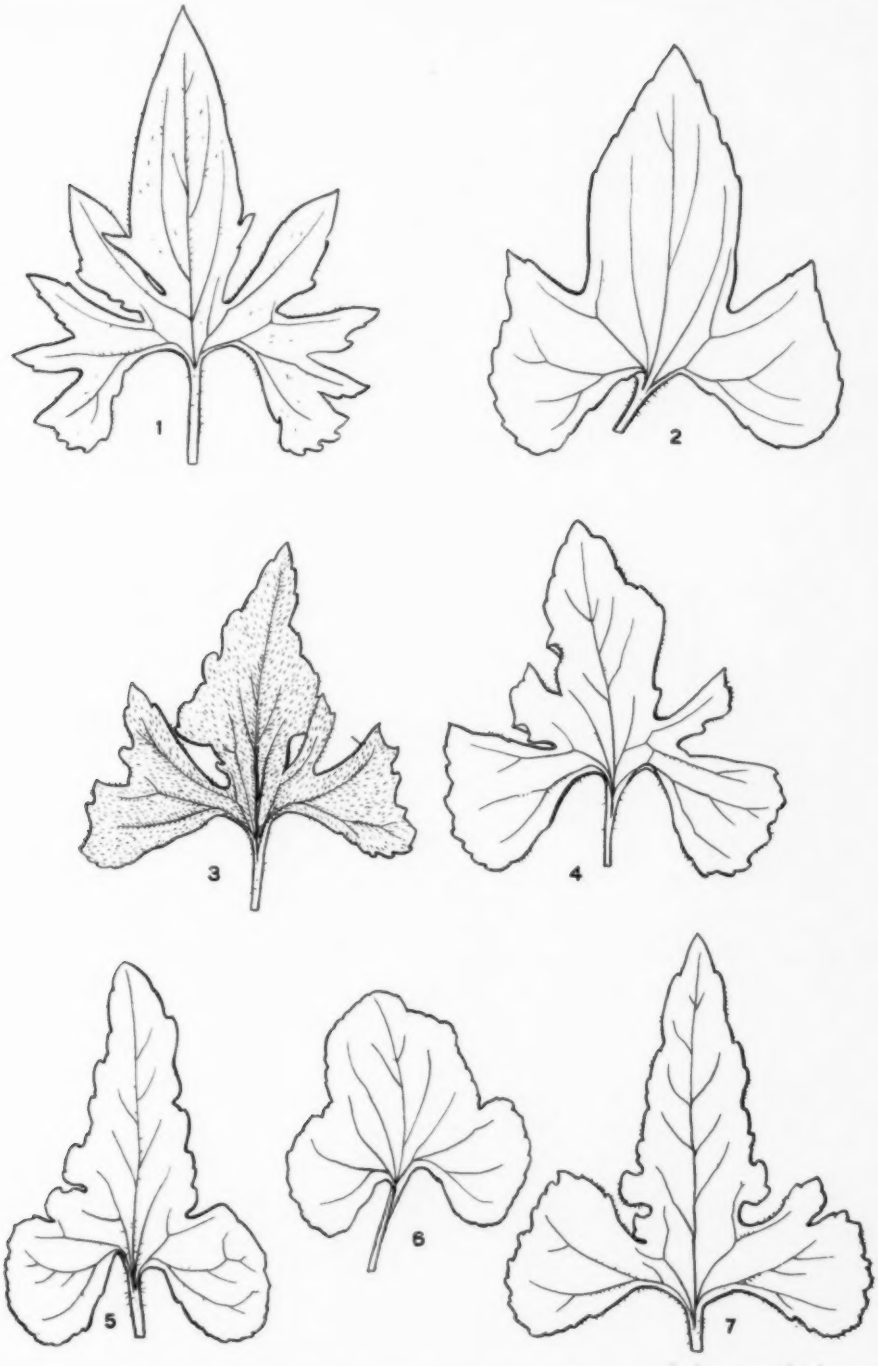
SEAVER, ON PYRONEMA



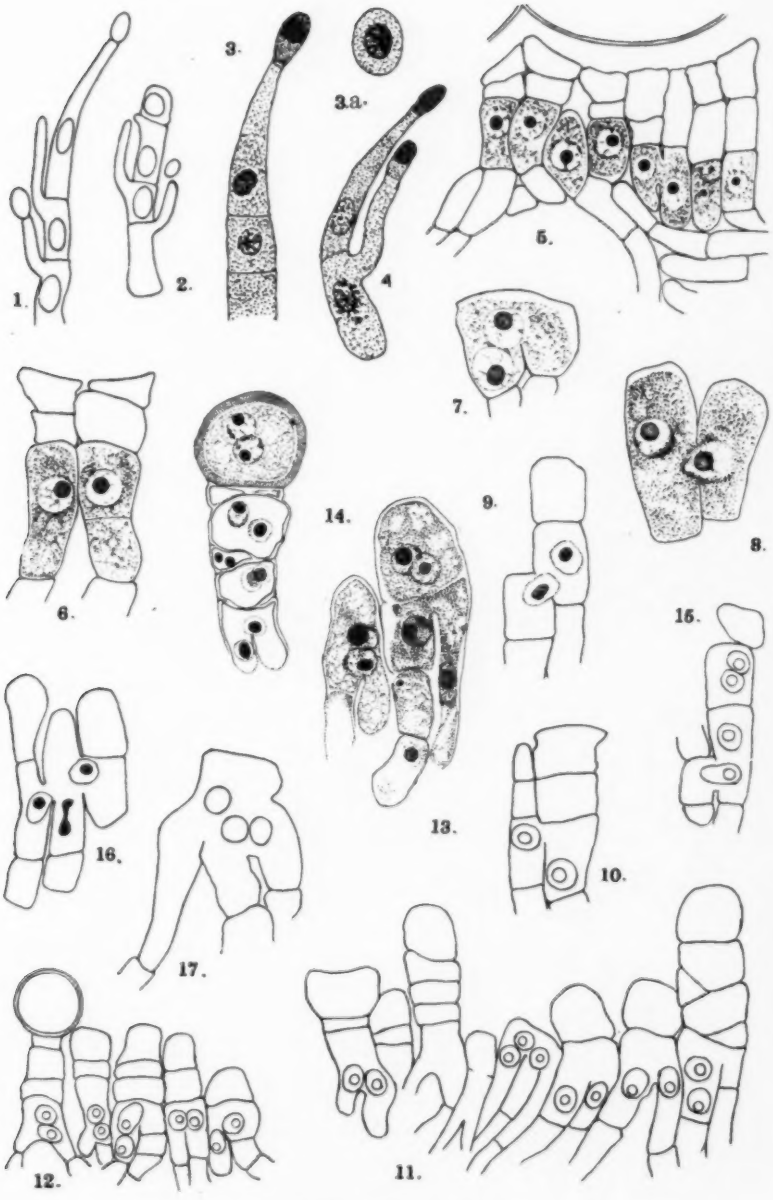
VIOLA PALMATA × PAPILIONACEA AND LEAVES OF THE PARENT SPECIES



THREE SEGREGATING OFFSPRING OF VIOLA PALMATA × PAPILIONACEA



LEAVES OF VIOLA PALMATA × TRILOBA AND OF ITS PARENTS AND ITS OFFSPRING



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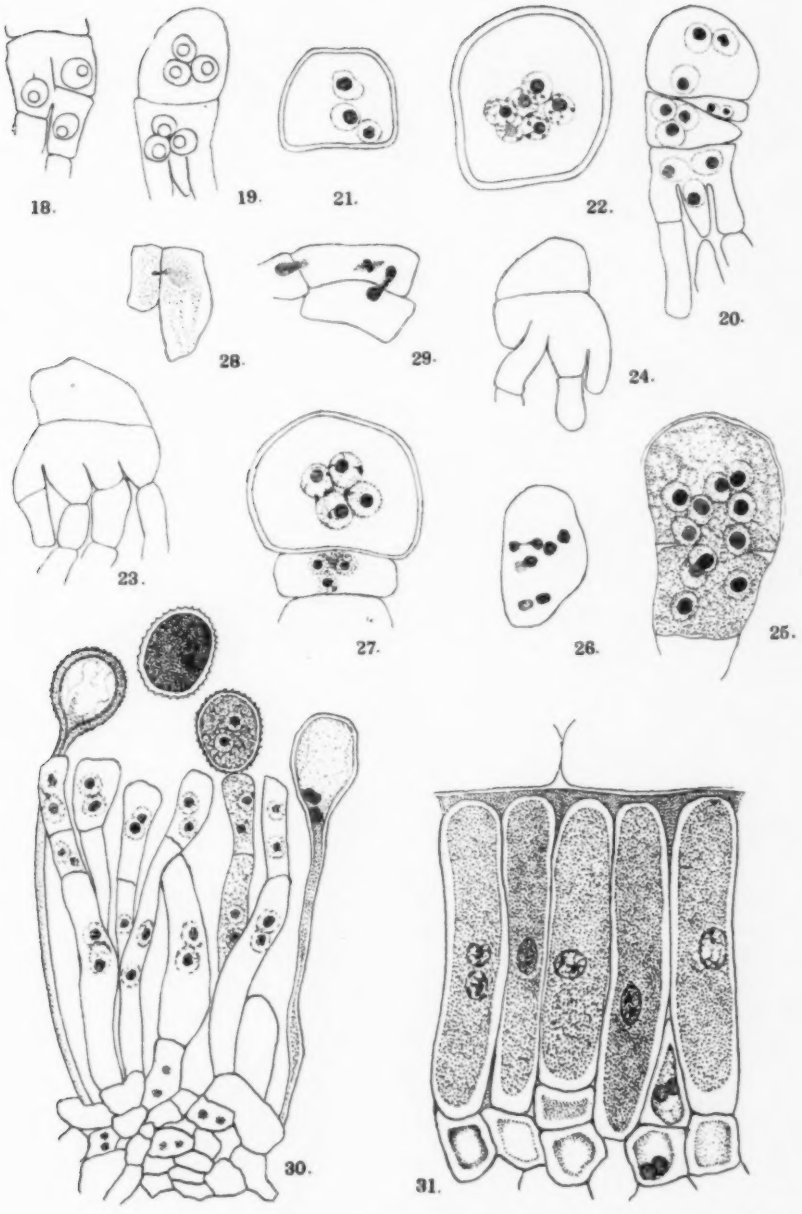

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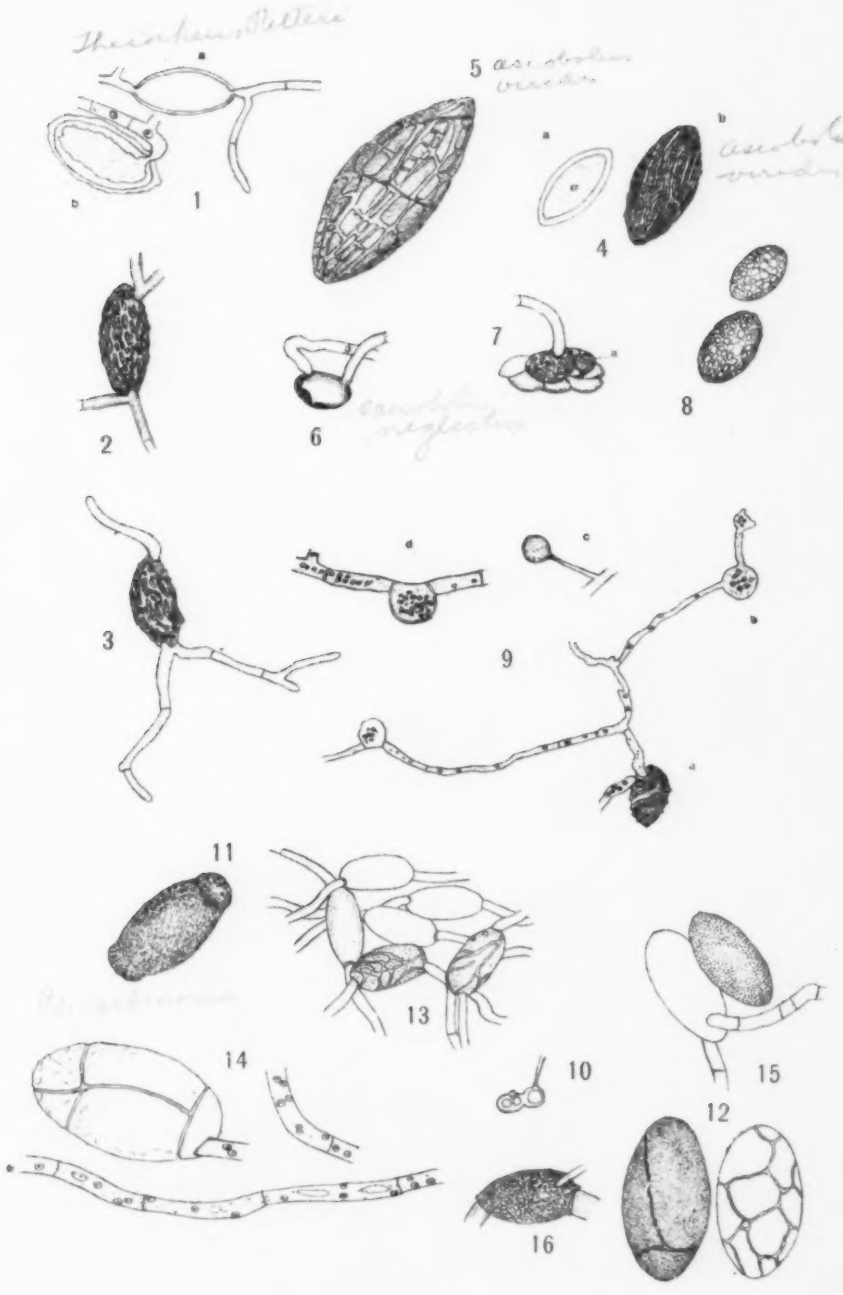

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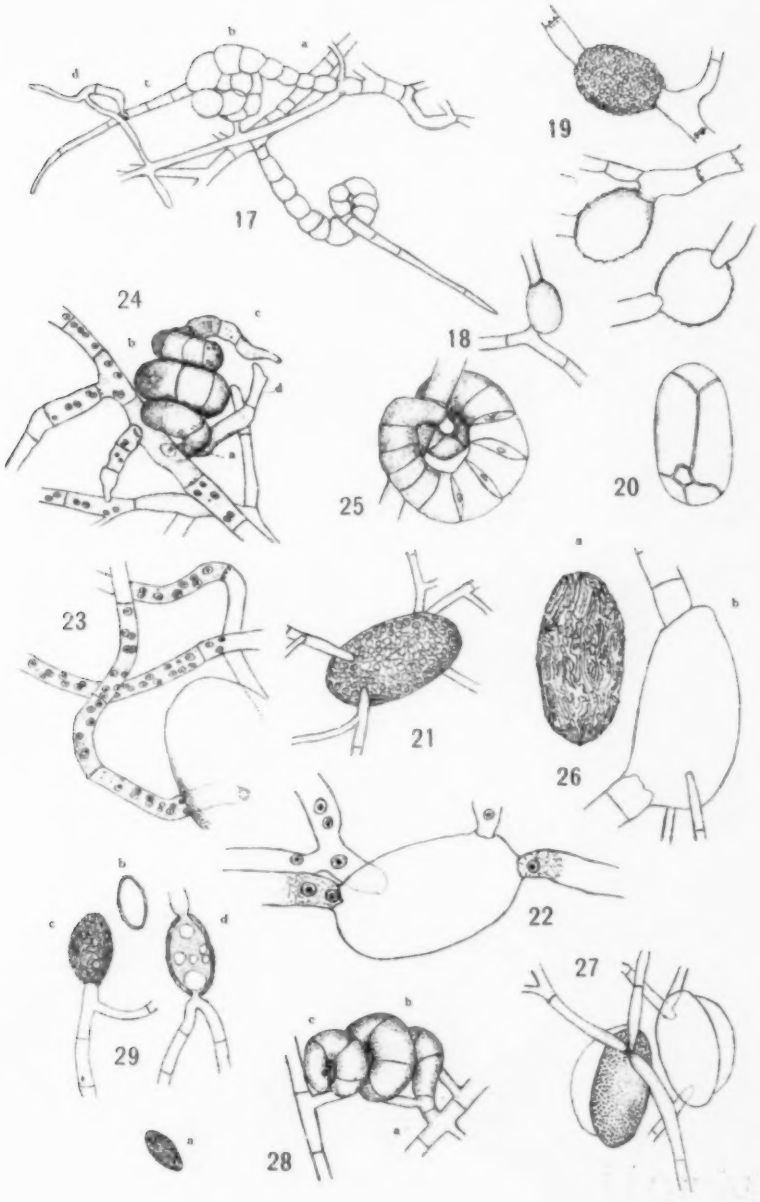

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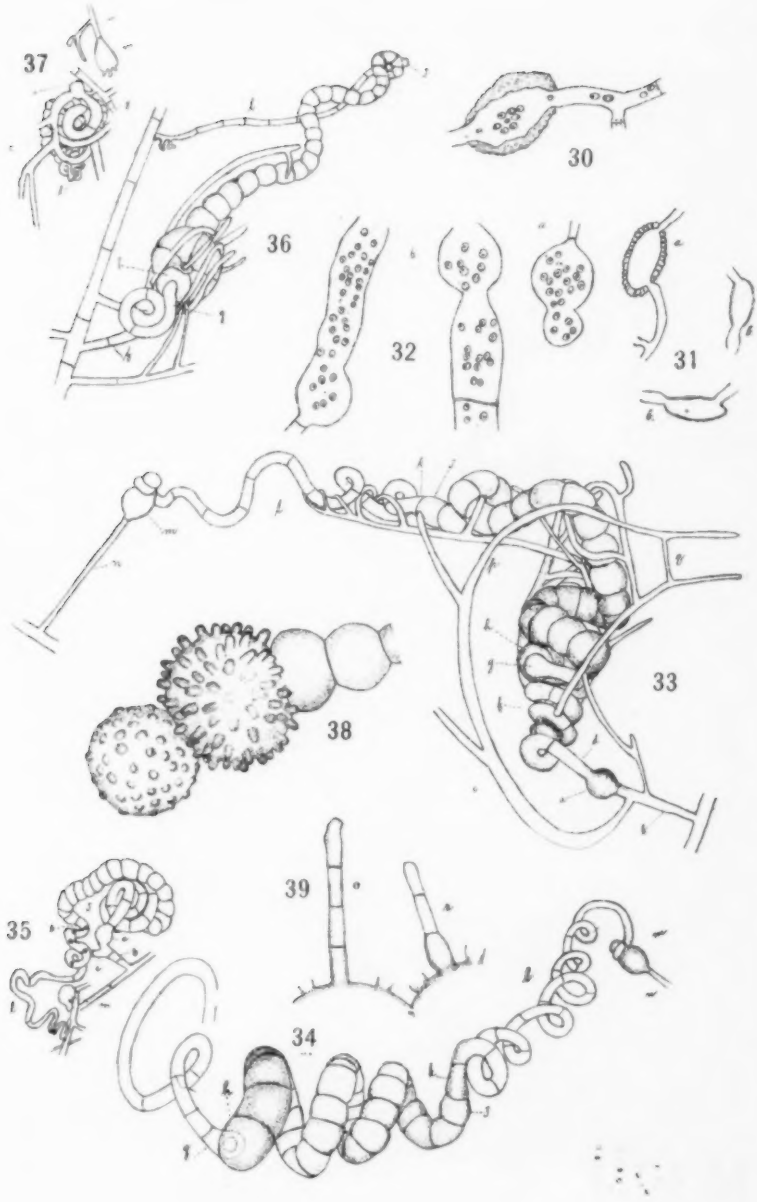
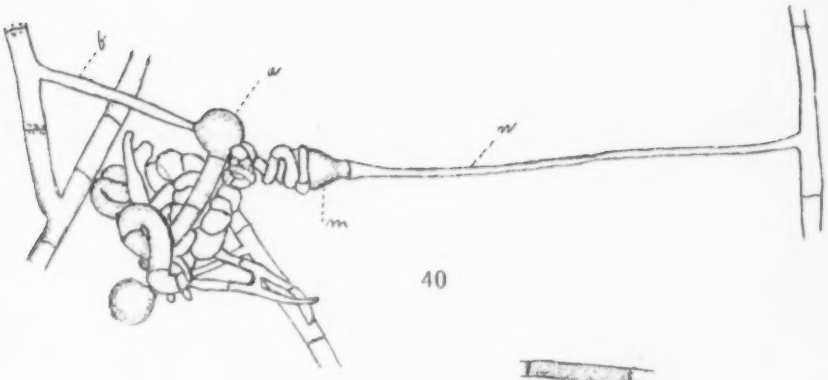


ASCOBOLUS CARBONARIUS



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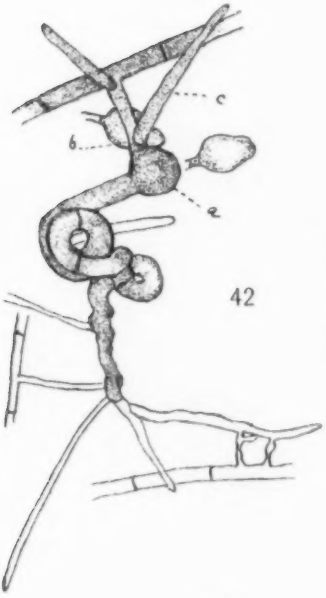

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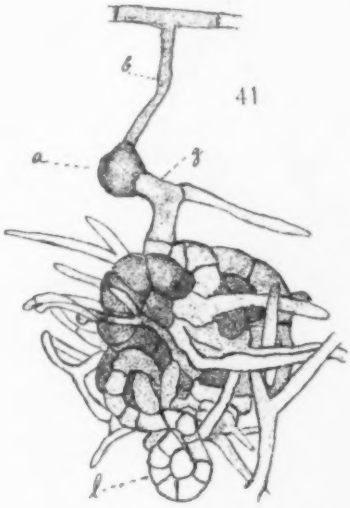

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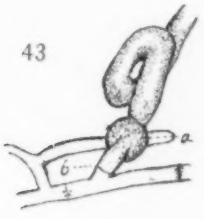

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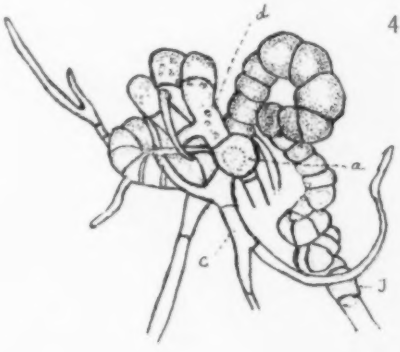

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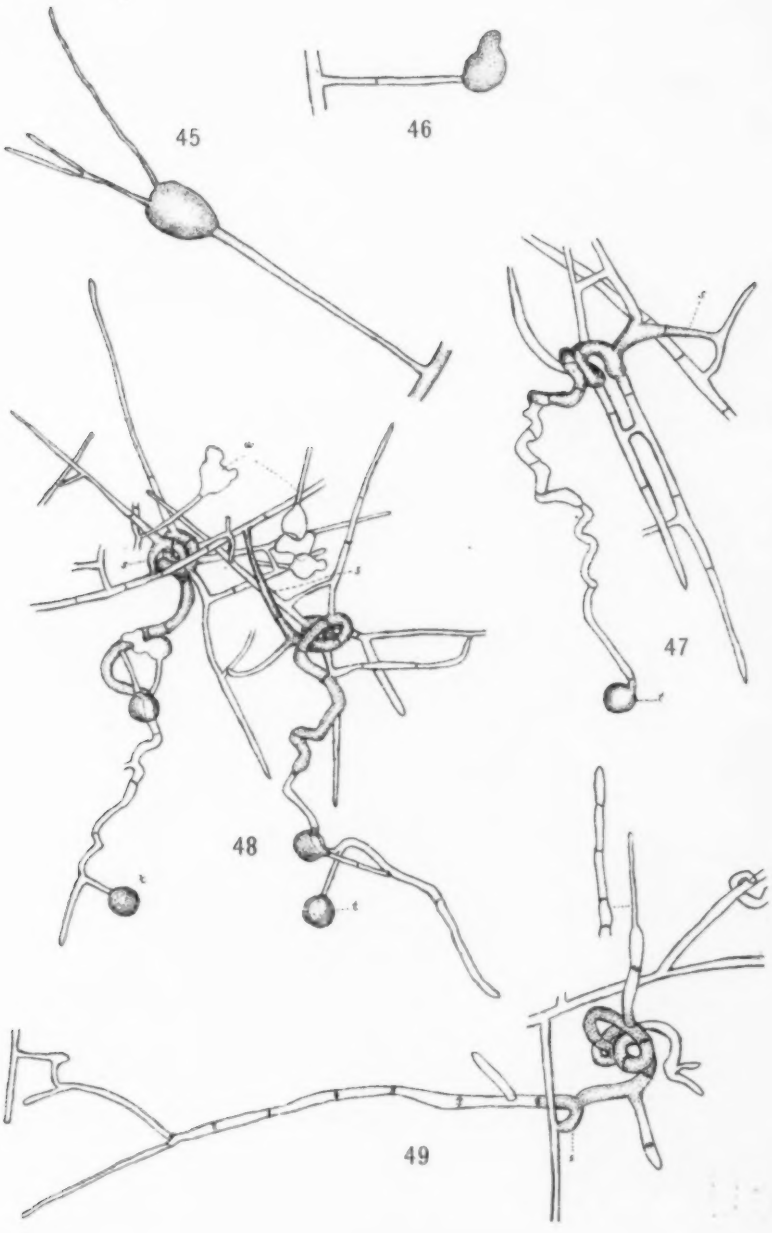

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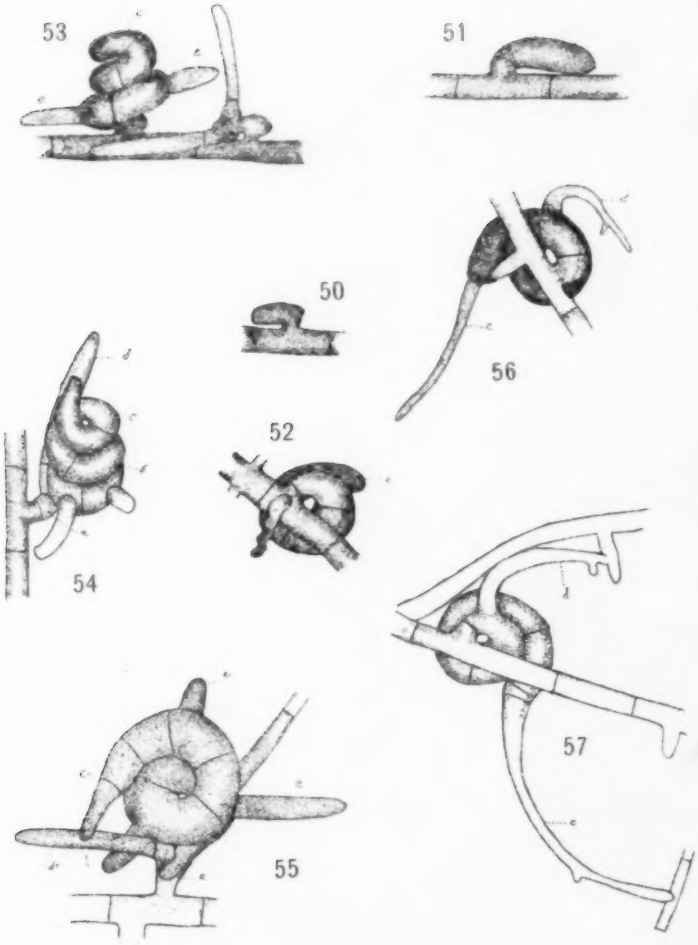
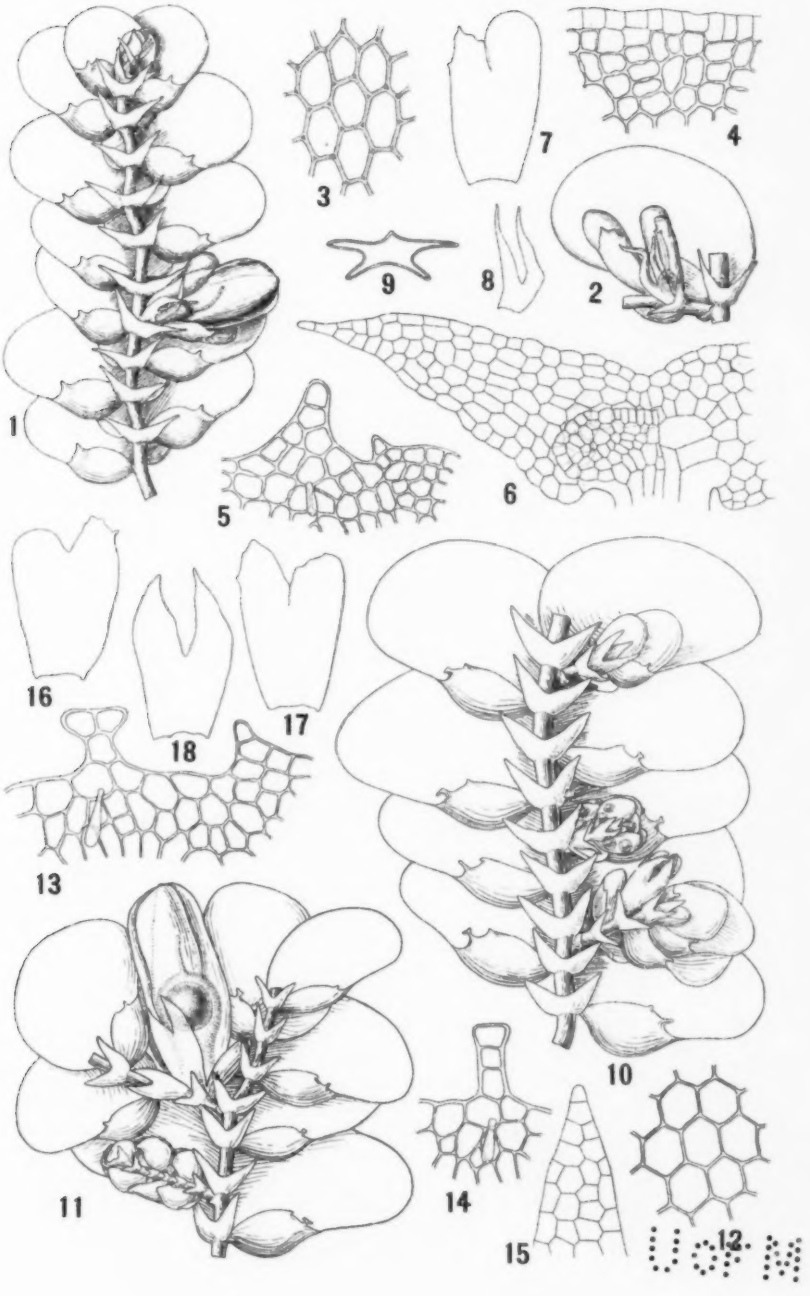
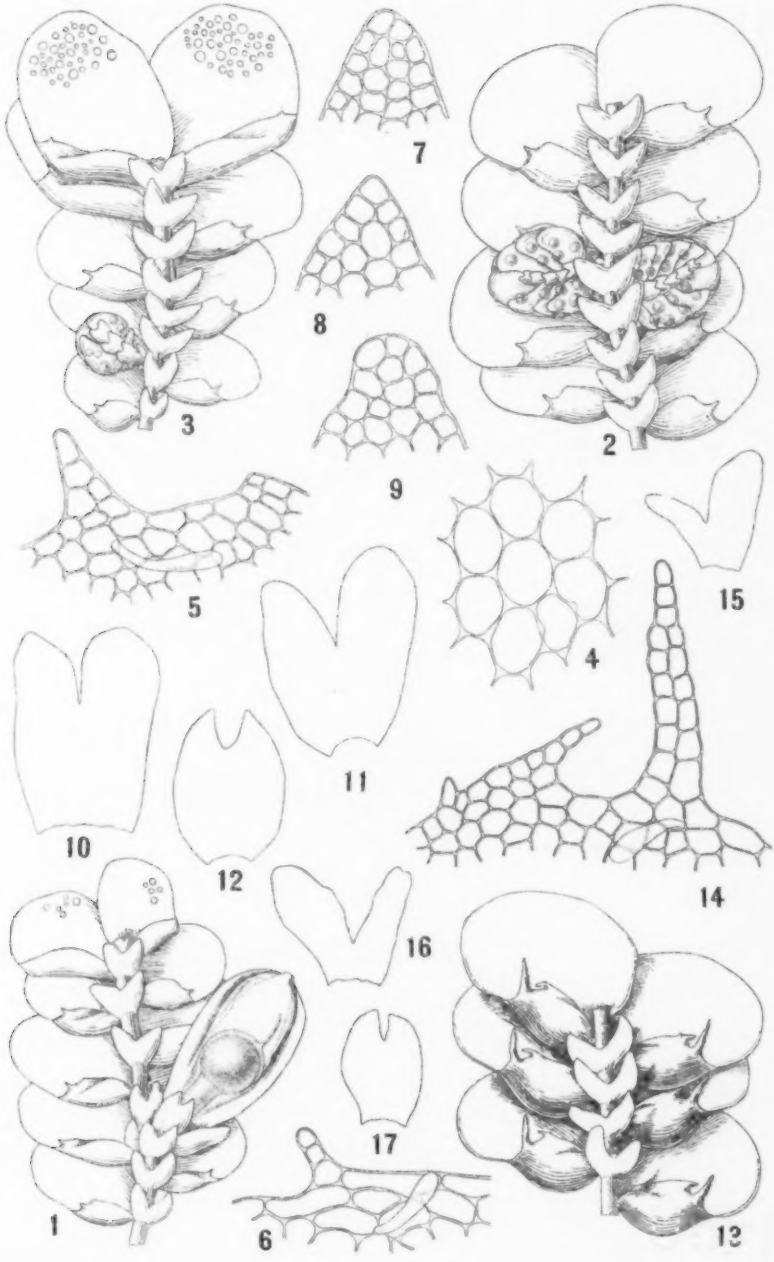


ASCOBOLUS WINTERI



1-9 DIPLASIOLEJEUNEA PELLUCIDA (Meissn.) Schiffn.

10-18 DIPLASIOLEJEUNEA BRACHYCLADA Evans



1-12 DIPLASIOLEJEUNEA UNIDENTATA (Lehm. & Lindenb.) Schiffn.

13-17 DIPLASIOLEJEUNEA RUDOLPHIANA Steph

BOTRYCHIUM SUBBIFOLIATUM Brack.

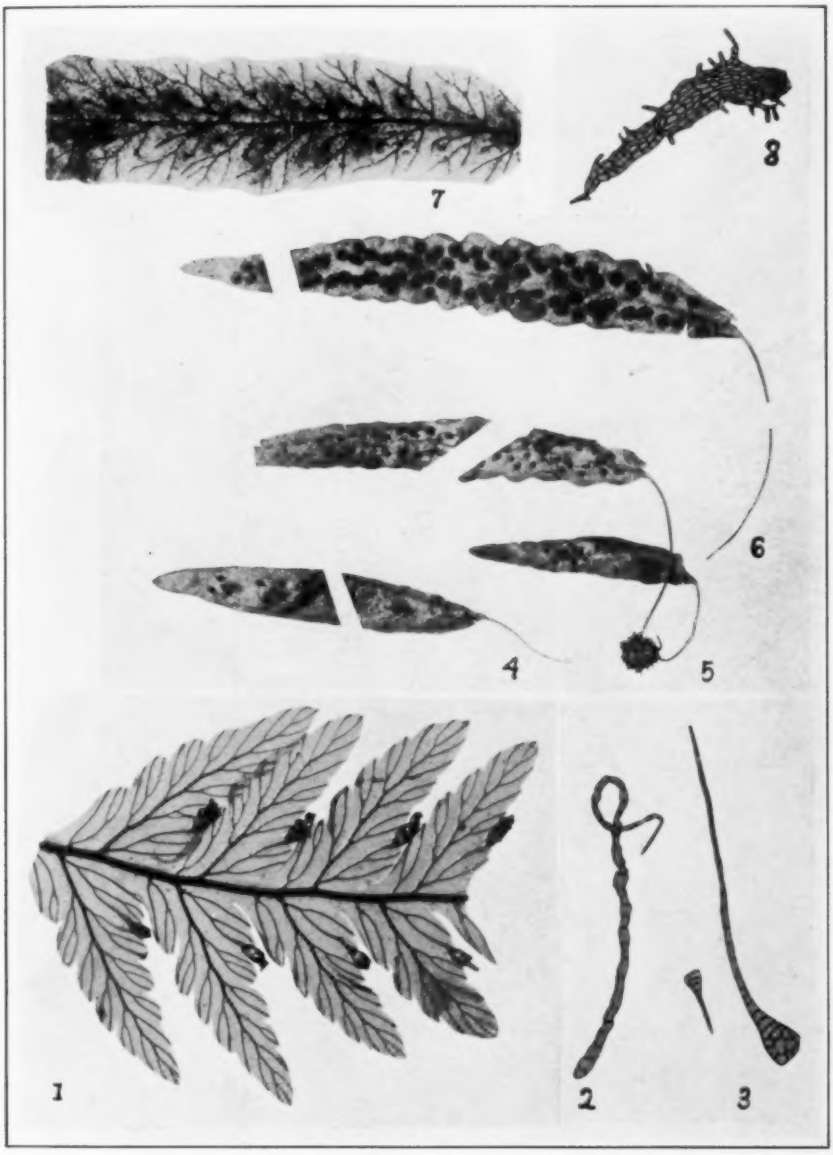
TRICHOMANES CYRTOTHECA Hilleb.

TRICHOMANES RADICANS SW.

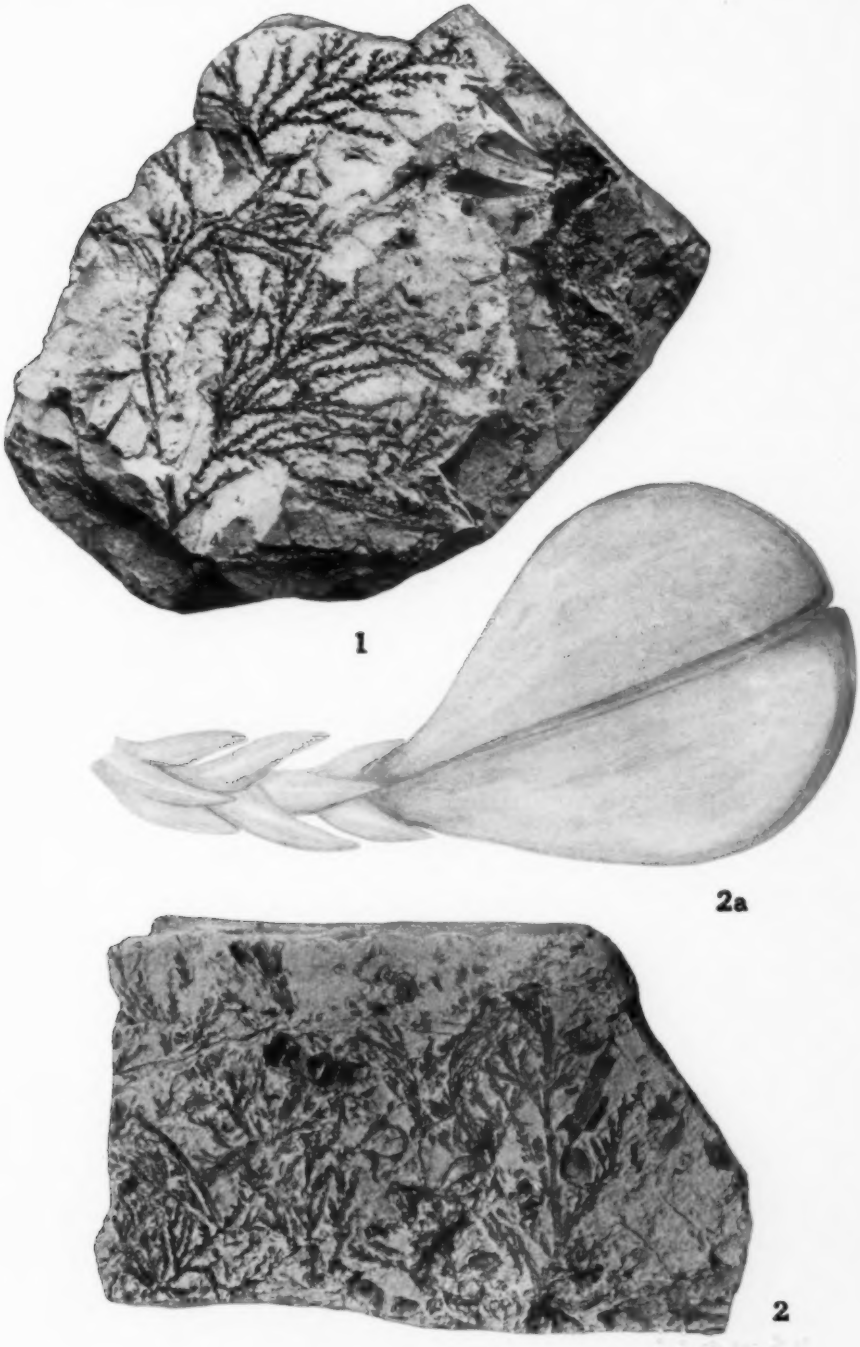
STRUTHIOPTERIS JAMAICENSIS Broadh. $\times \frac{1}{4}$.

(A scale 10 cm. long is shown on each sheet.)

STRUTHIOPTERIS MAXONII Broadh. × 3/8.



SLOSSON: NEW FERNS FROM TROPICAL AMERICA



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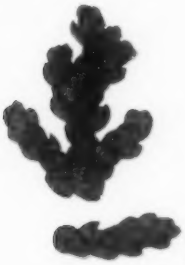
BERRY: WIDDRINGTONITES



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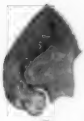

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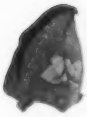

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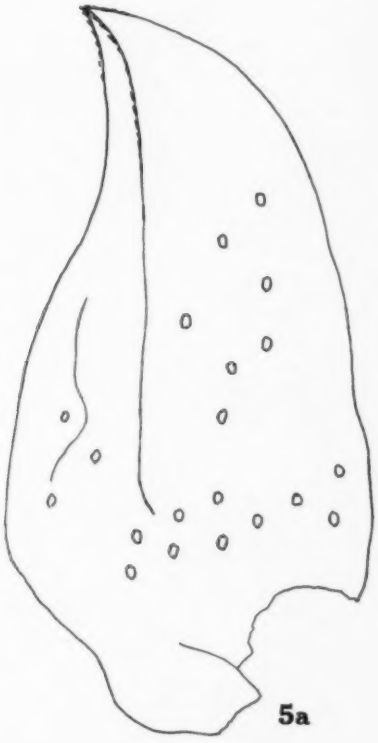

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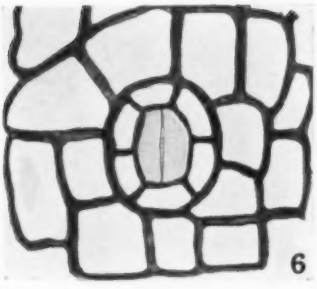

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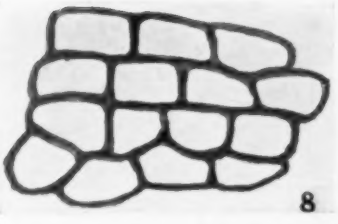

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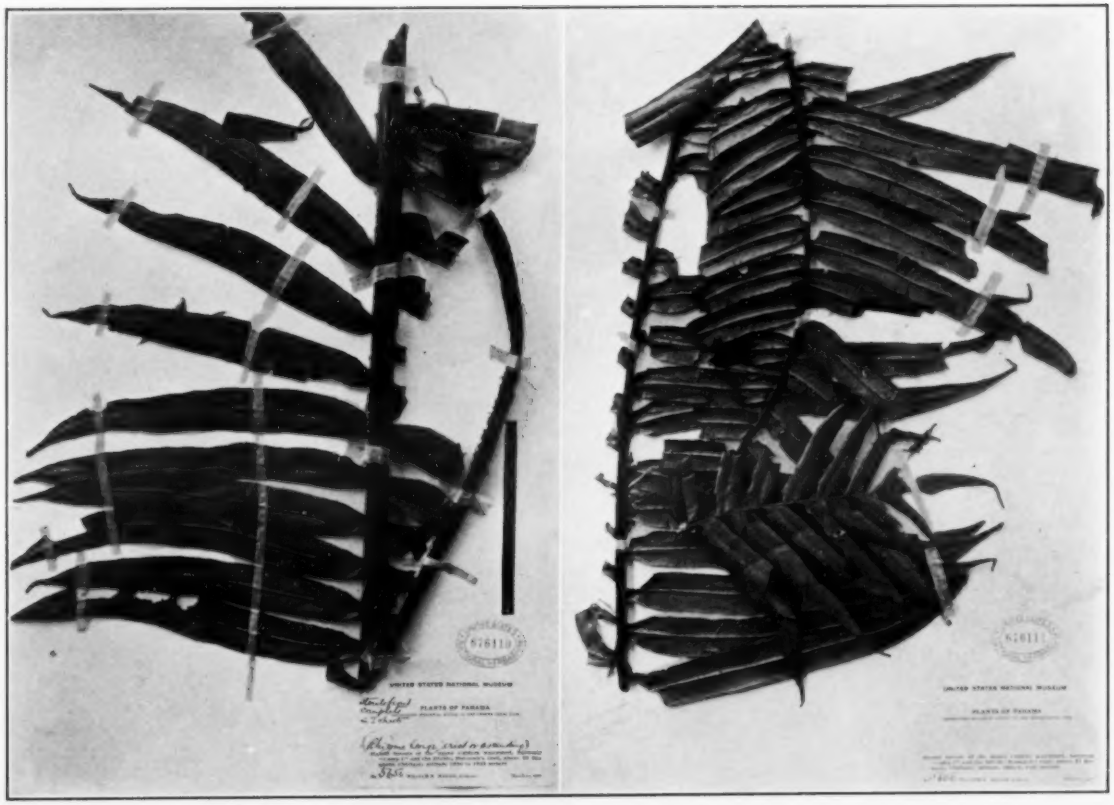

STRUTHIOPTERIS CHIRIQUANA Broadh. × ¼.

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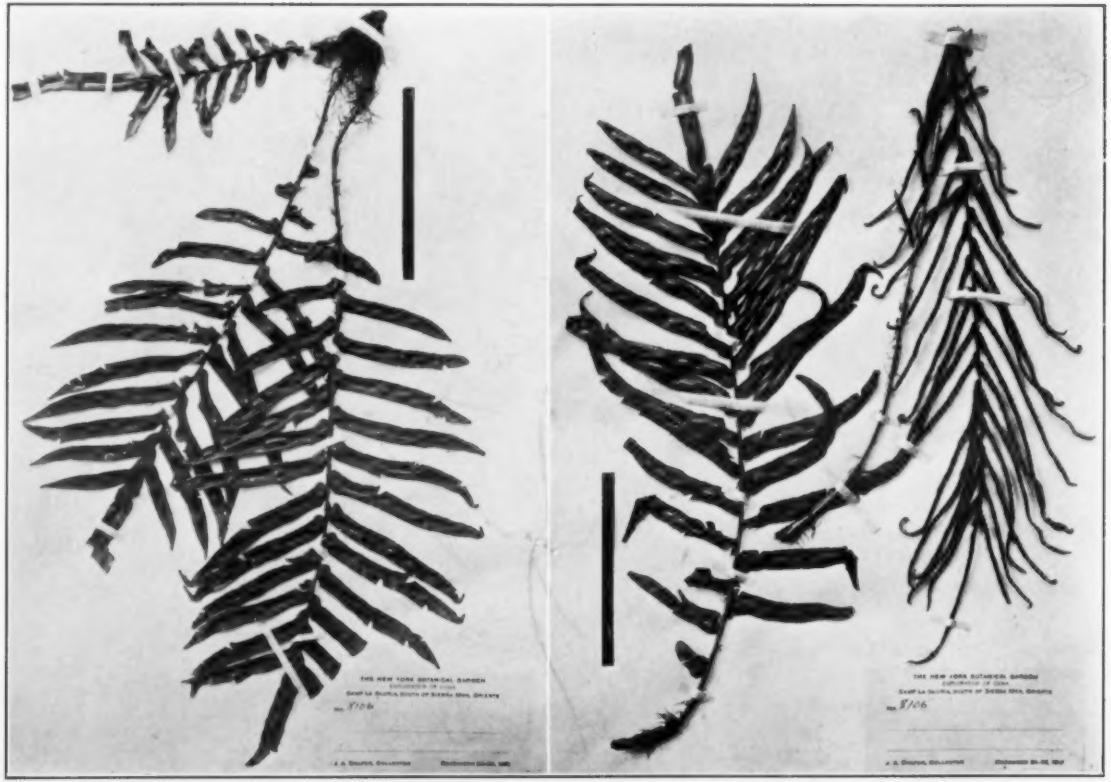

STRUTHIOPTERIS SHAFERI Broadh. × ¼.

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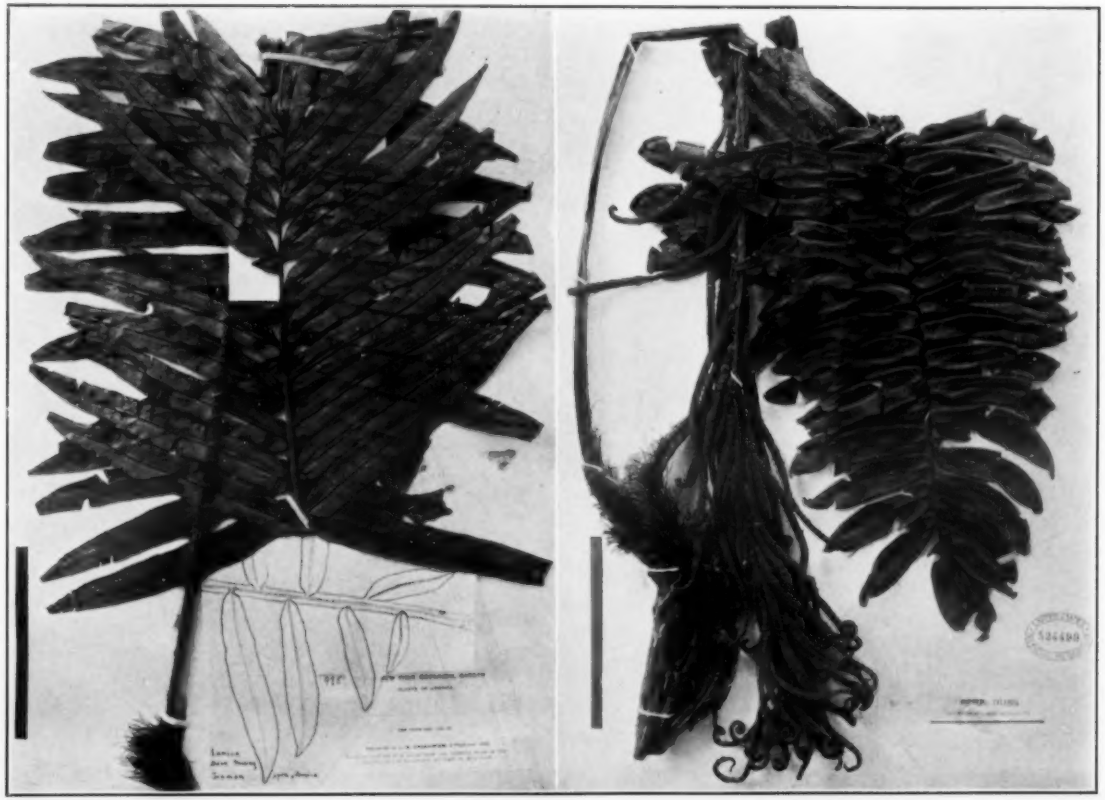

STRUTHIOPTERIS UNDERWOODIANA Broadh. STRUTHIOPTERIS RUFA (Spreng.) Broadh.

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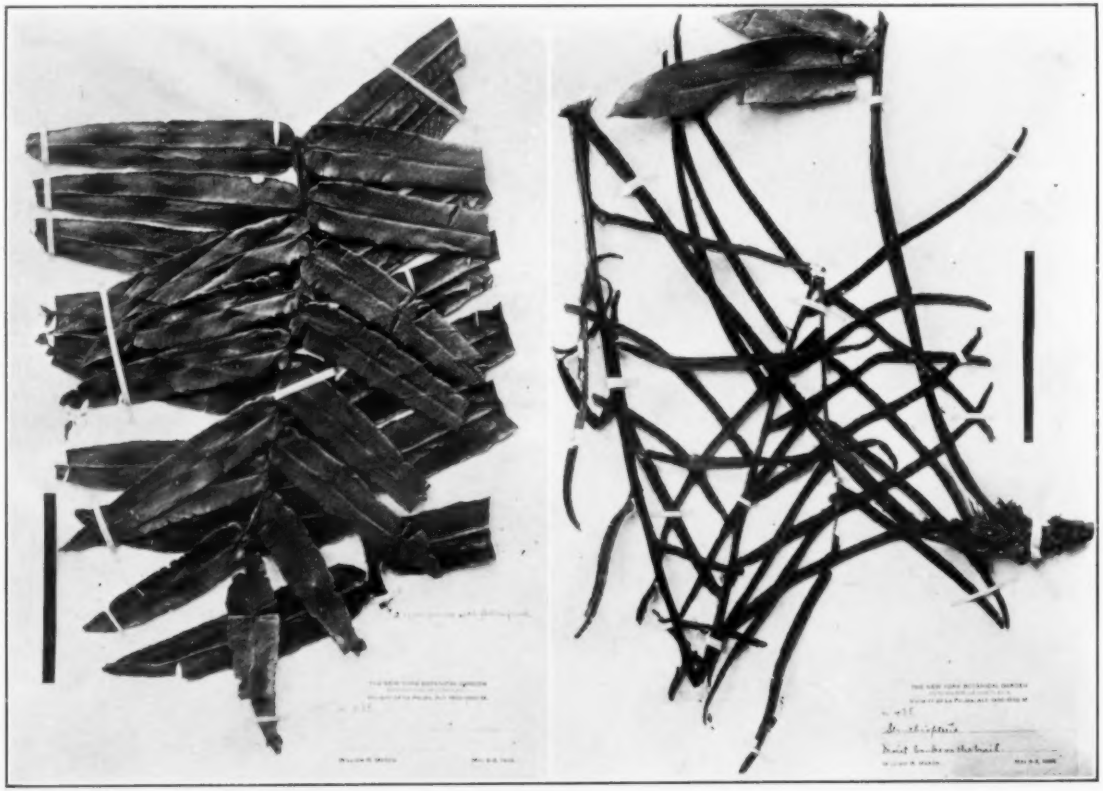

STRUTHIOPTERIS VIVIPARA Broadh. × ¼.

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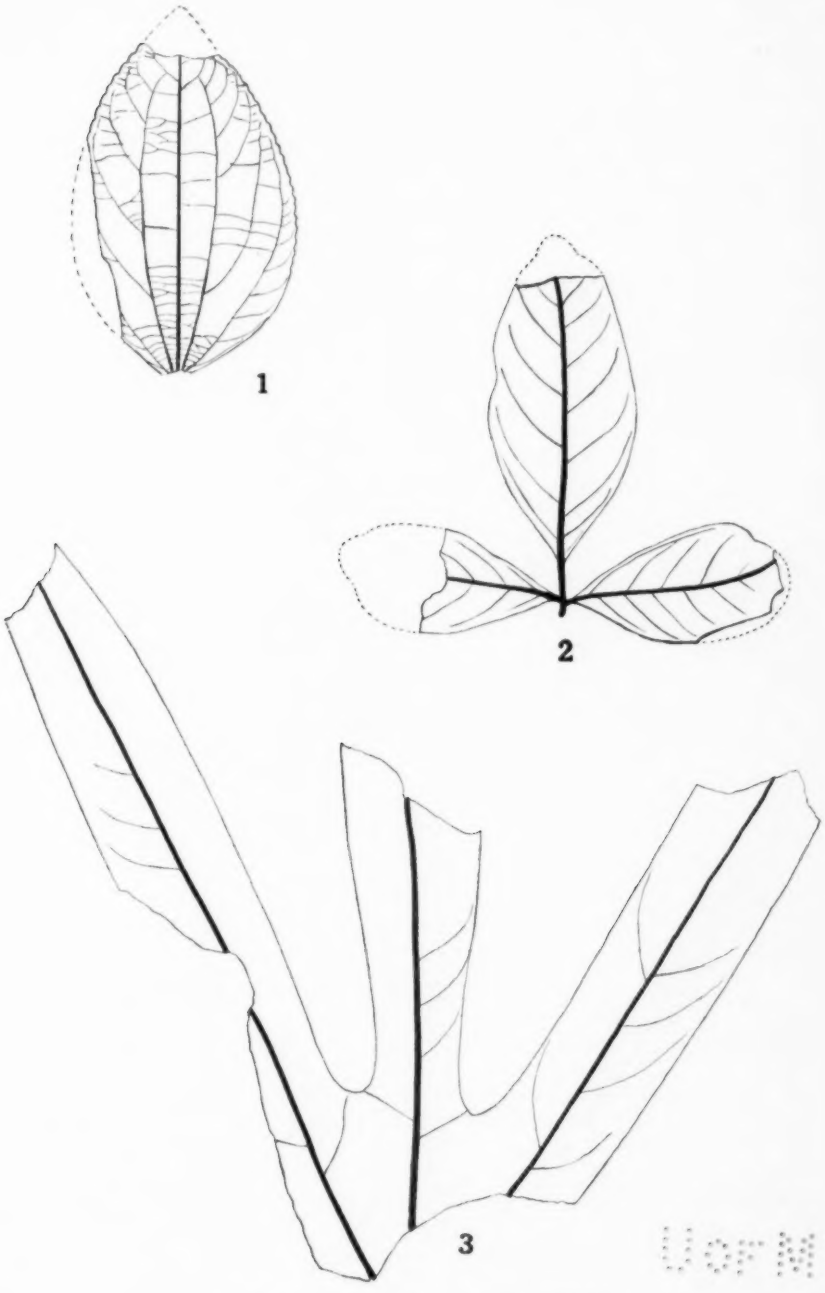
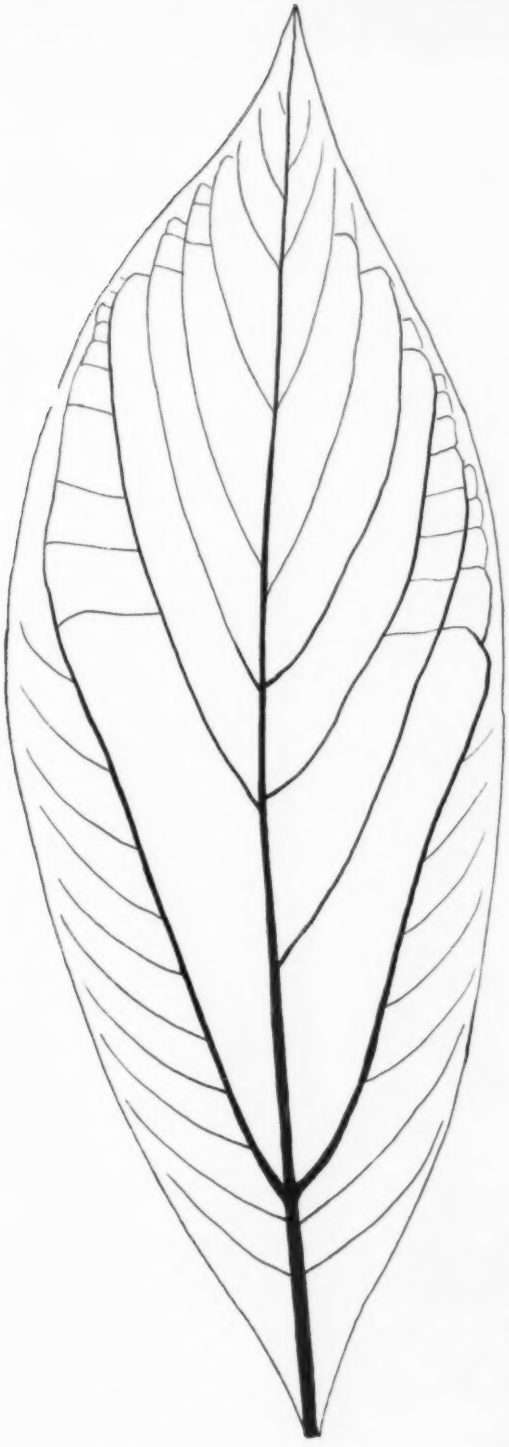


ZIZYPHUS, RHUS, and STERCULIA



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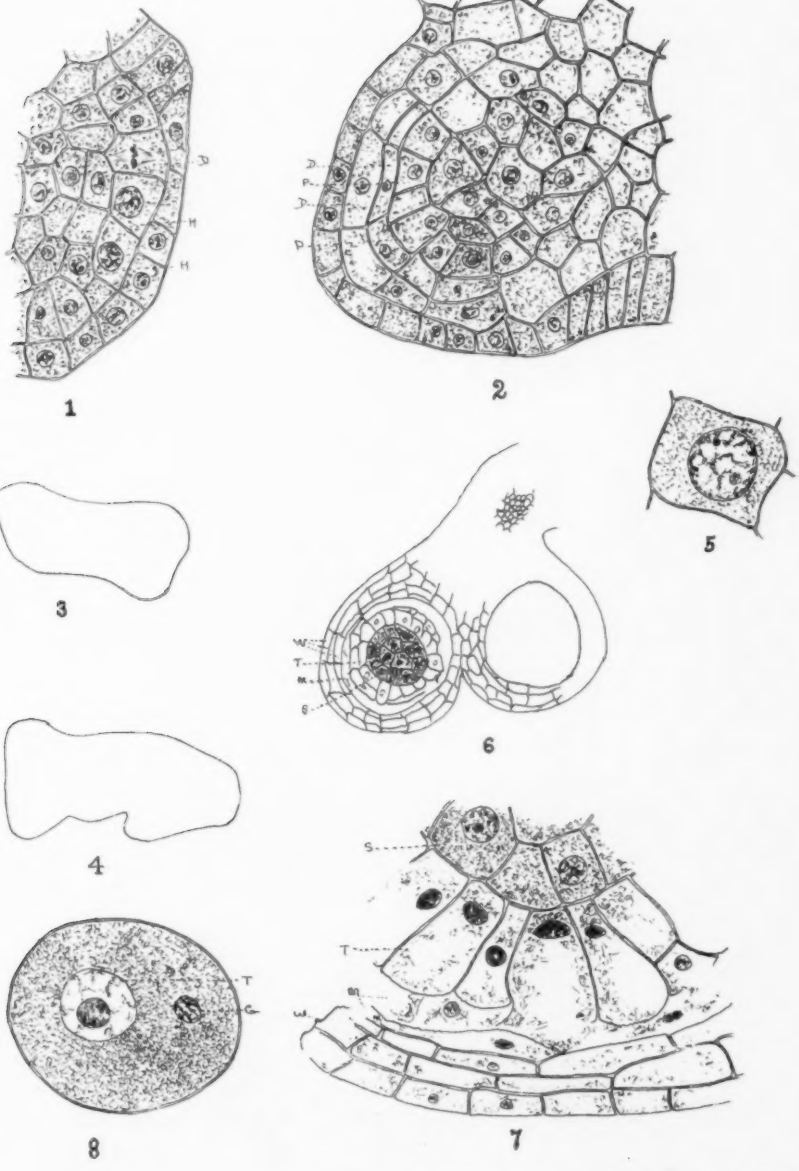
EFFECT OF ASPARAGIN ON WHEAT PLANTS



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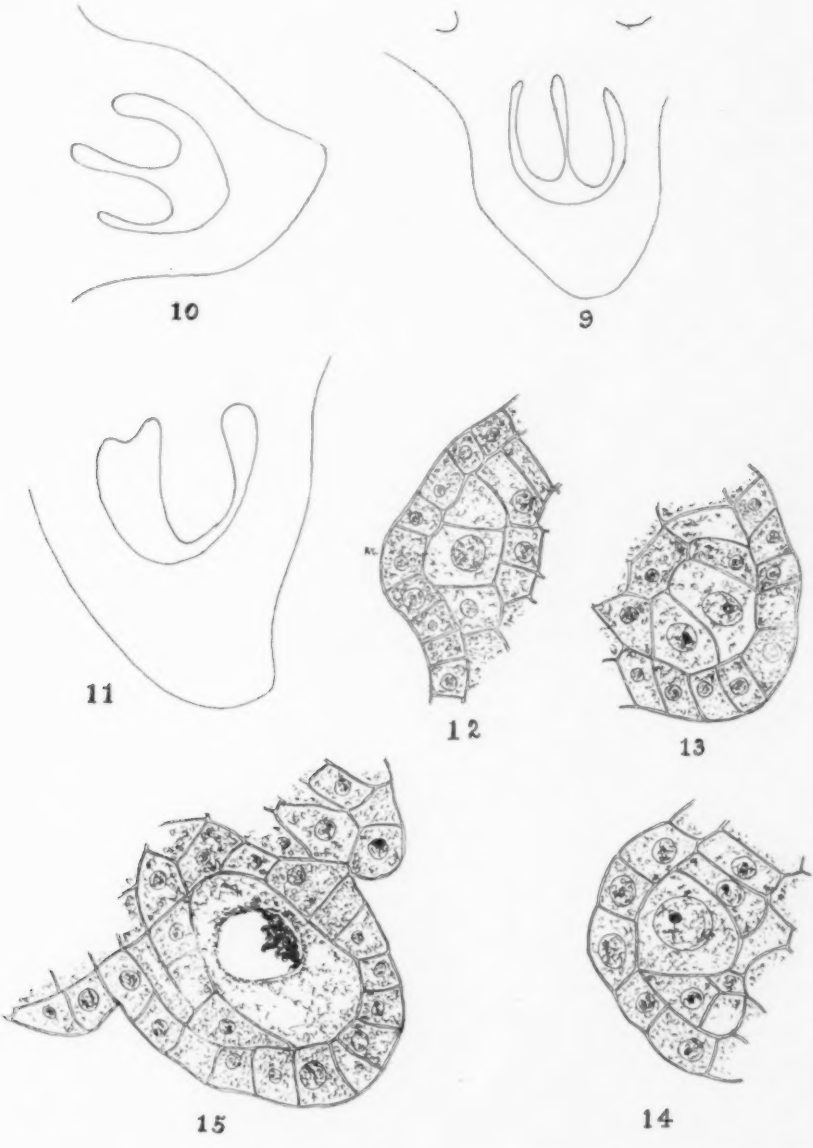

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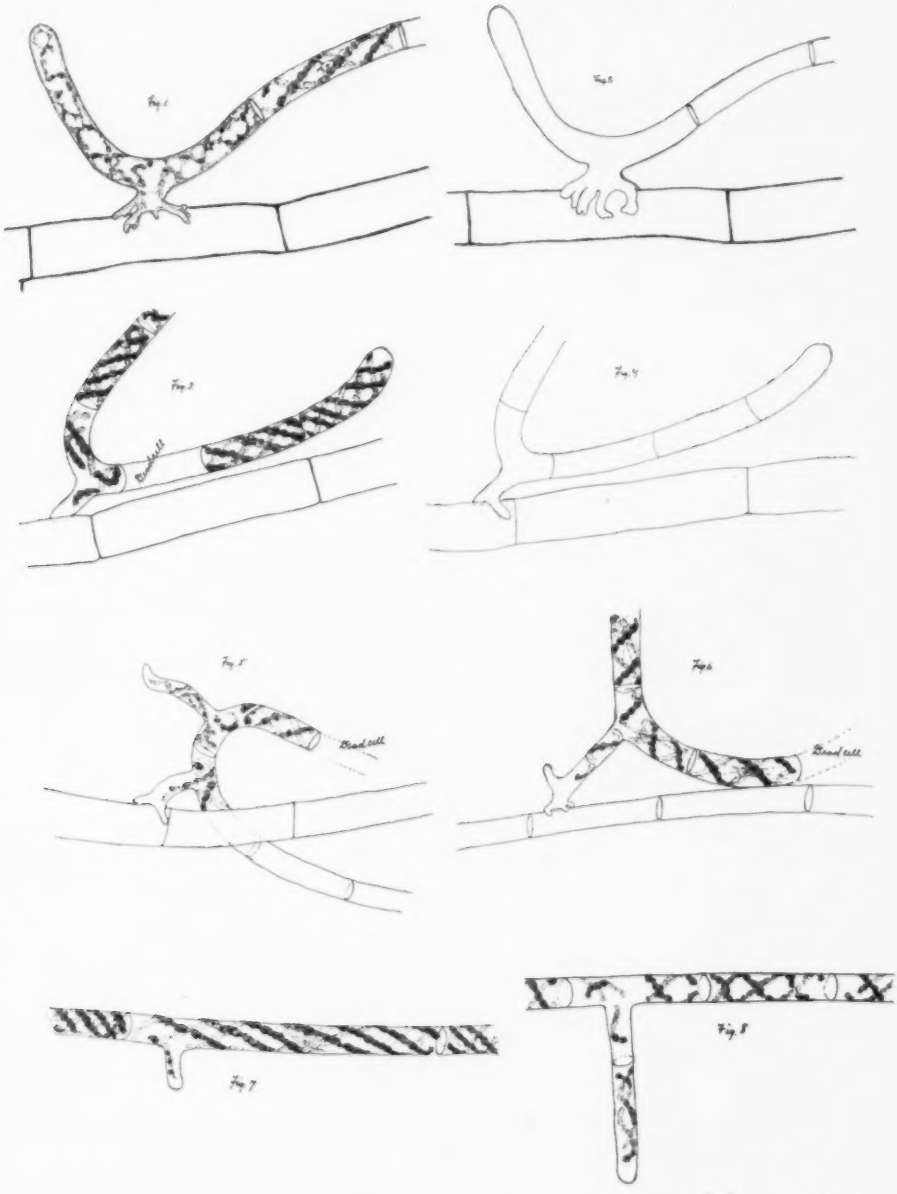


SPIROGYRA ELONGATA (× 350)

LAMARCK'S PLANT, TYPE OF OENOTHERA LAMARCKIANA SERINGE

OENOTHERA FROM THE COLLECTION OF ABBÉ POURRET

SPECIMENS REFERRED BY DE VRIES TO OENOTHERA GRANDIFLORA

ELAPHOGLOSSUM WAWRAE (Luerssen) C. Chr.

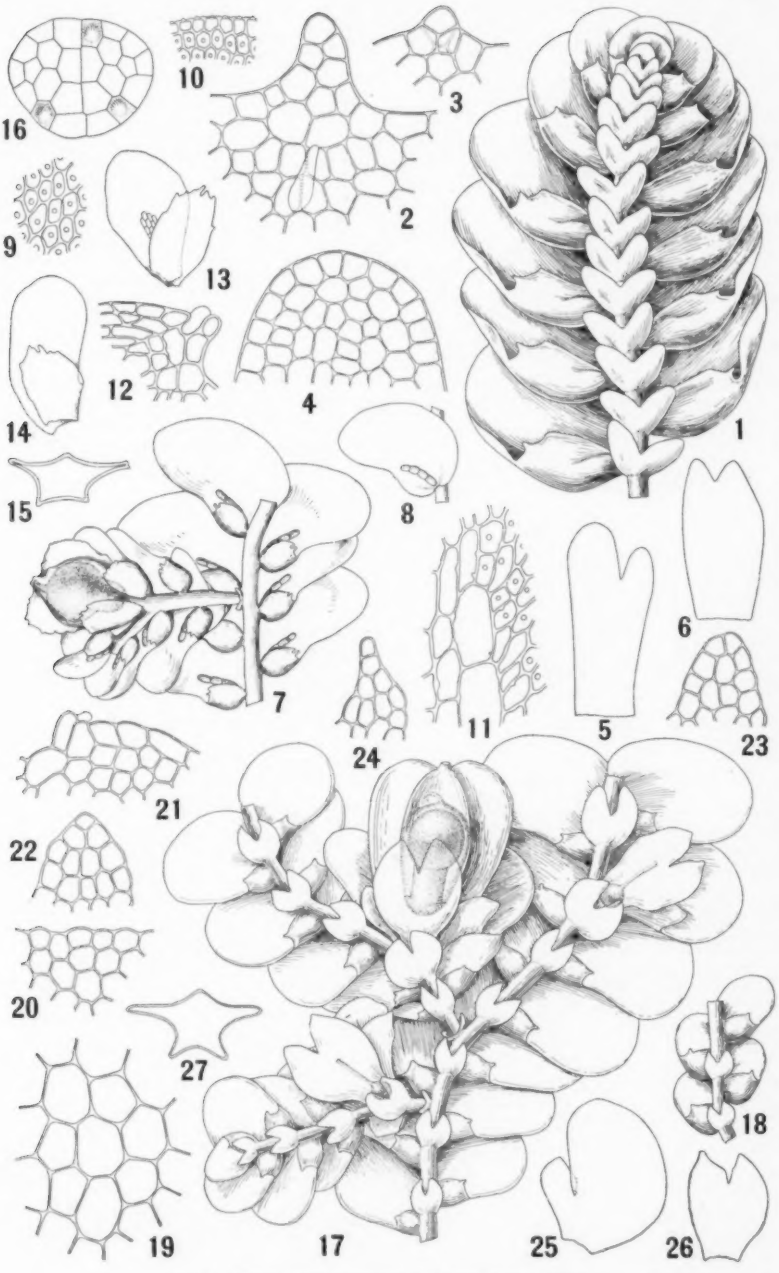
SCHIZOSTEGE LYDGATEI Hilleb.

Apex and basal pinna

DRYOPTERIS FUSCO-ATRA (Hilleb.) W. J. Robinson

DYOPTERIS NUDA UNDERW.

DRYOPTERIS PARVULA W. J. Robinson



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VOL. 39 DECEMBER 1912 NO. 12

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OF THE

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Volume 16. Pteridophyta, Gymnospermae.
Volumes 17–19. Monocotyledones.
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